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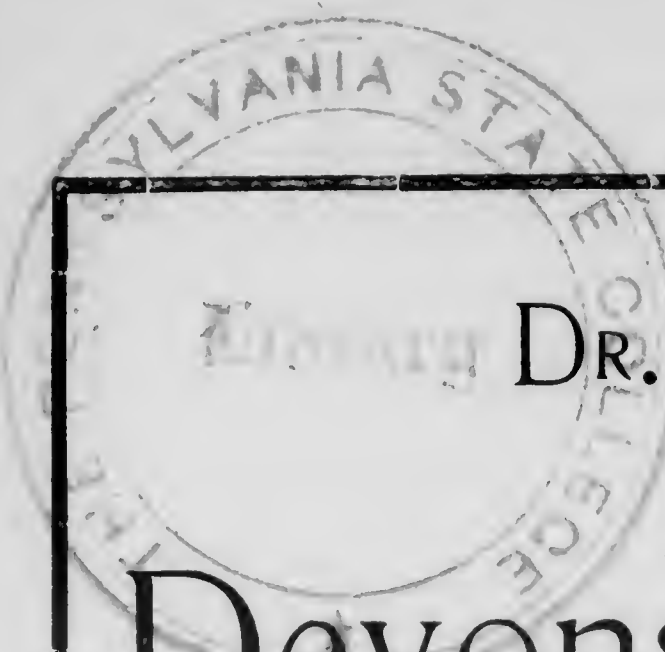
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BULLETIN No. 9 of

THE PENNSYLVANIA
LIVE STOCK BREEDERS'
ASSOCIATION.



PROCEEDINGS and PAPERS of
THE FOURTH ANNUAL MEETING,
HELD AT HARRISBURG,

December 10 and 11, 1902.



DR. J. C. MORRIS,

Importer and Breeder of

Devons and Berkshires



Duke of Molland, No. 6925 (Imported), The Present Head of the Fernbank Herd.

FERNBANK STOCK FARM,

BIRMINGHAM ROAD,

WEST CHESTER, PA.

At Home, Thursdays.

Jersey Home... ...Stock Farm.

CONTAINS THE BEST BLOOD OF THE WORLD.

Breeders of A. J. C. C.

Jerseys, Tamworth Swine

Brown Leghorn and

White Plymouth Rock

Chickens.

SERVICE BULLS IN USE.

Pedros Royal Son 46795—Sired by Pedro 3187, Champion Sweepstakes Bull at the World's Fair, Chicago, 1893, and sire of 45 tested daughters. Dam is a grand dairy cow by Pedro's Royal Marjoram 28560, sire of 8 tested daughters from 14 lbs. 6 oz. to 21 lbs. 4 oz.

Pedros Flora Marigold 54564—Sired by General Marigold 54486, owned by Mr. Geo. Vanderbilt, Biltmore Farms, N. C. General Marigold is a son of Mary Idagold, 23 lbs. 9 oz. and grandson of Ida Marigold, 25 lbs. 2½ oz. in 7 days. Champion winner at the World's Fair.

Young Golden Lad—Is a double grand son of Golden Lad, first prize over Island, Aug. '91, most prepotent bull the Island produced. Sire Golden Lad's Champion, first prize over Jersey, April '99. Champion winner April '99. Beating among others the champion winner of '98.

M. P. SHOEMAKER & BRO.,

Bell Phone 360, Ring 2.

GREENSBURG, PA.

WILLIAM F. GABLE,
PROPRIETOR.

F. E. TRAVER,
SUP'T.

GLEN GABLE STOCK FARM, WYEBROOKE. PA. (CHESTER CO.)

Guernsey Cattle, Shropshire Sheep, Chester White Hogs, Shetland Ponies, Buff and White Wyandotte, Buff Cochin, Light Brahma, Barred Plymouth Rock, White Leghorn and Black Minorca Poultry.

Our stock is selected from improved strains in their line.

We have Guernsey Bulls and Bull Calves for sale, also Shropshire Rams and Ram Lambs from Imported sires. Chester White Pigs of both sexes. Buff Wyandotte Cockerels \$2 to \$5. Eggs from Buff Cochin and Light Brahma \$1.50 for 15. Other breeds \$1.00 for 15.

Information and Prices Cheerfully Given.

J. C. MATTERN & SONS,
HOLLIDAYSBURG, PA.
(BLAIR CO.)

BREEDERS OF

Polled Durham Cattle and
Chester White Swine.

We breed both strains of Polled Durham Cattle, single and double-standard. Our herd has descended from Scotch blood and are low-down blocky animals.

Our Chester Whites are large, strong, early maturing animals.

Farms located at Hollidaysburg on the P. R. R. Breeding Stock for sale. Correspondence solicited.

FAIRFIELD STOCK FARMS
FURNISS. PA.

We keep Jerseys as a business proposition and make it pay. Our cows are the best we can afford and we try to improve them. PEDRO OF FAIRFIELD 50626, a son of Old Pedro, heads our herd and does his best. When you want good Jerseys write

W. F. McSPARRAN,
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BARRED PLYMOUTH ROCKS.
28 YEARS A BREEDER.

Can sell you as good birds as any breeder. Can furnish Single Birds or Mated Pens at fair prices that cannot be excelled for size, shape and plumage.

NOTHING EXCELS THEM.

My breeding yards this year are the finest I have ever had. Eggs \$2 P 15, 26 for \$3, \$5 P 100.

Also PEKIN DUCKS of high quality, Rankin strain.

Eggs \$1.00 per 13.

E. JOHNSON, DOLINGTON, BUCKS COUNTY, PA.

A. T. REPLOGLE,
WATERSIDE, BEDFORD COUNTY, PA.

Breeder of CHESTER WHITE HOGS and
BARRED PLYMOUTH ROCKS.

I breed the original type of Chester White Hogs, the large, strong, hardy, early maturing, profitable kind.

My stock has been carefully selected from the oldest and best line bred herds in the locality in which the breed originated, their characteristics are firmly established, and they breed true to type. Pigs all ages, both sexes, not related for sale.

My Barred Rocks are Farmer strain, hardy, quick maturing, and good layers. Choice birds for sale at all times, and eggs in season. Correspondence solicited, satisfaction guaranteed.

J. F. Lantz.

J Irwin Lantz.



WATERSIDE FLOCK OF SHROPSHIRE SHEEP

J. F. LANTZ & CO., Barneston, Chester Co. Pa.

Importers and Breeders of Shropshire Sheep, Breeders of Jersey Cattle, Chesterwhite Hogs, Barred Plymouth Rocks and Pekin Ducks.

Waterside Flock of Shropshire Sheep was founded in 1888 on imported ewes. Only the best and most carefully selected imported rams, from the flocks of Wm. Thomas, Wm. Ward, A. E. Mansell, T. G. Jukes, Harry Williams and David and Thomas Buttar have been used in this flock. Every ewe is sired by an imported ram and bred to an imported ram.

We now have at the head of the flock the imported ram "White Plume" bred by Thomas Buttar, sired by "Buttar's Reserve," a winner at the "Royal Show" in England, and hired one season for a flock of 50 ewes for \$750.00. The dam of our "White Plume" is by that noted sheep "Bonny Beau" the sire and grandsire of many winners, and a sheep which has stamped his fashionable and aristocratic characteristics on many of the best flocks of England.

"White Plume" is one of the best and finest breeding rams in America.

"White Plume" sired the lambs winning 1st. prize at the New York State Fair in 1902, in competition with the best flocks in America, and some imported flocks.

We furnish certificate of registration and extended pedigree with each sheep sold. Correspondence solicited.

J. F. LANTZ & CO., Barneston, Chester Co., Pa.

BROWNLEE 1736.

Homestead Stock Farm,

N. O. BROWNLEE, Breeder and Shipper of the Finest Strains of Registered



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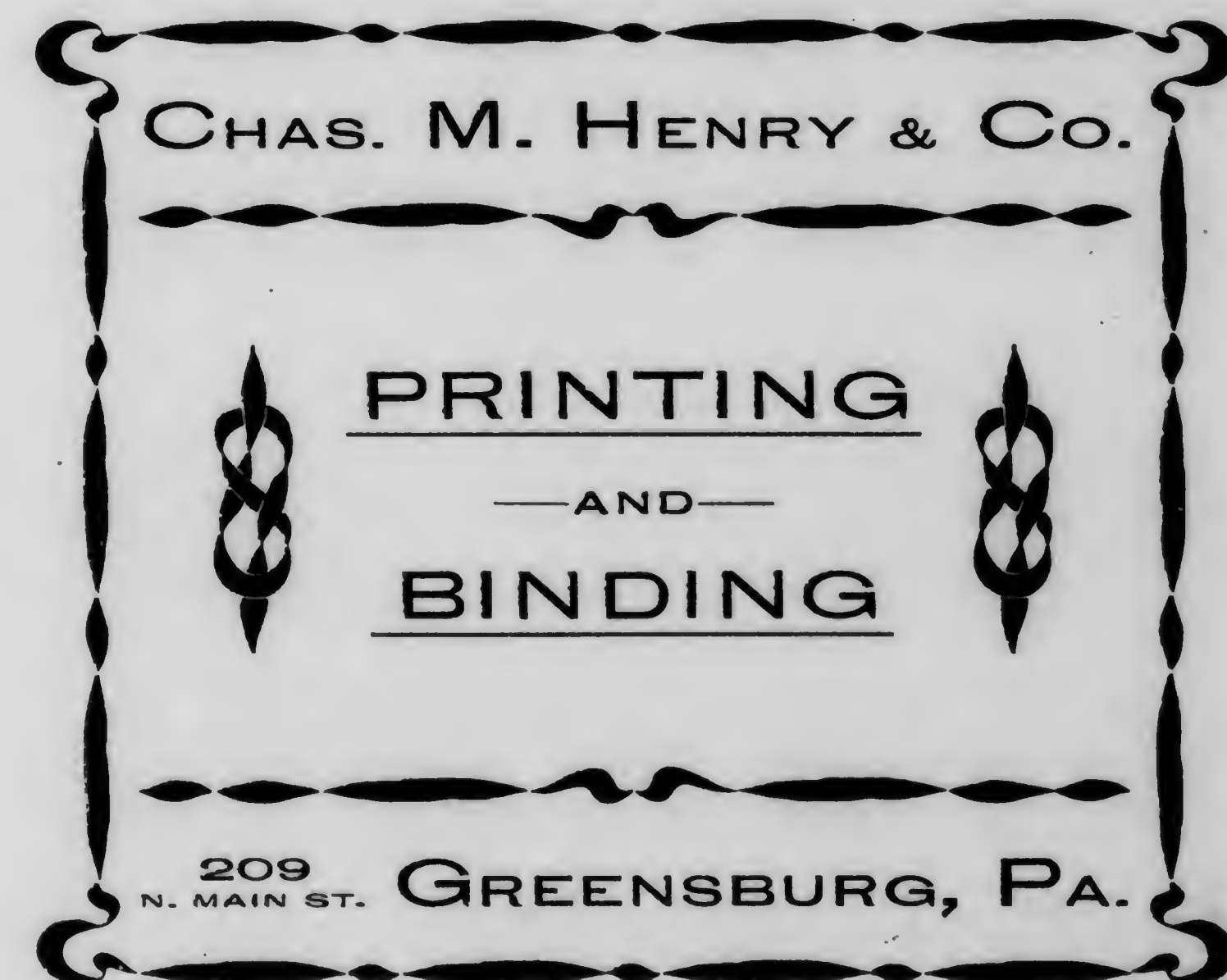
CATTLE,

PLYMOUTH ROCK CHICKENS,

BERKSHIRE SWINE.

CLAYSVILLE, PA.

Express Office—Claysville or Taylorstown.
Wheeling and Pittsburg Division B. & O. R. R.



America's Leading Horse Importers!



Ours were the
**FAVORITE
PERCHERONS**

at the recent

INTERNATIONAL
LIVE STOCK EXPOSITION,
CHICAGO.

Five of our importation won **FIRST**. Another one of ours won **CHAMPIONSHIP**. Our stallions won **TEN** out of a possible **SEVENTEEN** prizes. Our French Coach Stallions won **EVERY FIRST** prize at the great Chicago Horse Show. With our Percheron and French Coach Stallions we won **EVERY FIRST** prize at the Iowa State Fair, Kansas State Fair, Kansas City Horse Show, Central South Dakota State Fair, and Ohio State Fair, including **GRAND SWEEPSTAKES**, all draft breeds competing. In France our horses were equally successful in the show ring, fifty of them being prize winners in the two leading shows. We import more and therefore can sell cheaper than anybody else.

M'CLAUGHLIN BROS.,
COLUMBUS, OHIO.

BRANCHES :—

EMMETSBURG, IA.

KANSAS CITY, MO.

THE U. S. WINS IN VERMONT.

At the Vermont Dairymen's Association,
Rutland, Jan. 6-8 1903, there were 150
entries and

THE BUTTER SCORING THE
HIGHEST; 98½ POINTS

was made from cream separated by
U. S. Separator, and

WON THE GRAND SWEEPSTAKES
AND GOLD MEDAL.

This was not only the highest score at
this meeting, but so far this season was

THE HIGHEST SCORE AT ANY
DAIRYMEN'S ASSOCIATION.

Also Wins in Maine.

At the Maine Dairymen's Association,
Waterville, Dec. 3-5, 1902,

THE HIGHEST SCORE,
THE SECOND HIGHEST,
THE THIRD HIGHEST

were all made by users of U. S. Separators and included the

HIGHEST IN BOTH THE DAIRY
AND CREAMERY CLASSES.

The U. S. butter had more entries and
averaged higher than our "would-be
competitors" and

Won 10 FIRST,
9 SECOND and
6 THIRD PRIZES.

And in New Hampshire.

At the New Hampshire Dairymen's Association,
Littleton, Dec. 2-3, 1902,
there were more entries of U. S. butter
than all other systems combined and
they averaged the Highest and Scored
the Highest in

DAIRY TUB, CLASS A,
DAIRY TUB, CLASS A-2,
DAIRY PRINTS,
CREAMERY PRINTS.

Taking 4 FIRST,
2 SECOND,
4 THIRD PRIZES.

And at New York.

At the New York Dairymen's Convention,
Jamestown, Dec. 9-12, 1902,

THE HIGHEST SCORE,
98 POINTS

Won by the DIAMOND CREAMERY Co.,
J. L. Hyde & Son, Prop'rs, Massena,
N. Y., users of 13 No. 0, (largest size),
U. S. Separators, each one replacing
an Alpha-DeLaval or Sharpless Separator.

The U. S. also holds THE WORLD'S RECORD for Clean Skimming.

Illustrated Catalogues FREE for the asking.

VERMONT FARM MACHINERY COMPANY, Bellows Falls, Vermont.

PROCEEDINGS AND PAPERS

OF

FOURTH ANNUAL MEETING

OF

THE PENNSYLVANIA
LIVE STOCK BREEDERS'
ASSOCIATION

Held at Harrisburg, December 10 and 11, 1902.

OFFICERS

President, W. C. NORTON, Aldenville
First Vice-President, HENRY PALMER, Avondale
Second Vice-President, M. P. SHOEMAKER, Greensburg
Secretary, E. S. BAYARD, East End, Pittsburg
Treasurer, J. F. LANTZ, Isabella

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1902

1903:
CHAS. M. HENRY & CO.,
MAGAZINE PRINTING AND BINDING,
GREENSBURG, PA.



The Pennsylvania Live Stock Breeders' Association.

FOURTH ANNUAL MEETING,
Harrisburg, Pa., December 10 and 11, 1902.

Wednesday, December 10th, 7:30 p. m., the Hon. W. C. Norton,
president, in the chair.

Report of the Treasurer :

OFFICE OF TREASURER.

Barneston, Chester County, Pa., March 30, 1903 :

Balance in the Treasury, December 18, 1901.....	\$ 15 47
Receipts during the current year, from Dec. 18, 1901 to Dec. 11, 1902.....	214 00
Total.....	\$229 47
Expenditures from December 11, 1901 to December 11, 1902.....	210 77
Balance in Treasury December 11, 1902.....	\$ 18 70

J. F. LANTZ, Treasurer.

We the undersigned auditors appointed by the president W. C. Norton, have
audited the accounts of J. F. Lantz, find them correct as audited, with balance on
hand \$18.70.

December 11, 1902.

HENRY PALMER,
W. C. PERHAM.

Report of the Secretary :

Bulletin No. 7 is the Secretary's re-
port.

Messrs. Henry Palmer, and W. E.
Perham were appointed an Auditing
Committee.

Mr. E. S. Bayard, Secretary, moved
that the Constitution be so amended

that the date of the next Annual Meet-
ing may be left with the Executive
Committee. Carried.

The Nominating Committee was ap-
pointed as follows:

W. G. POWELL, Shadeland, Pa.
M. P. SHOEMAKER, Greensburg, Pa.
N. NORMAN, APP, Selin's Grove, Pa.

The American Pig and Its Improvement.

By Prof. C. S. Plumb,
of Ohio State University.

The history of the pig in the United States for we will say the past 100 years has witnessed some most interesting changes. The parent stock introduced to America came largely from Great Britain, and to a limited extent from China. The British breeds were somewhat coarse in character, though variable in type. The Chinese pig was fine of bone, very productive of meat, and was used to improve the coarser British stock. The Berkshire and White breeds of British were narrow-backed, long-legged, and very wasteful in dressing, and lacked the refinement of the modern porker.

In the early part of the nineteenth century the farmer and stockman generally desired considerable weight in his farm animals. So far as the meat type of animal was concerned the stockman wanted size and feeding capacity. In an address before the Jefferson Co., New York, Agricultural Society in 1820 Mr. E. Bronson says: "We shall probably all agree that a hog of small bone, thick flesh and quiet disposition is to be preferred." The Plough Boy of 1820, one of our very earliest agricultural journals, contains numerous references to big cattle, sheep and swine. In the March 3, 1821, issue is an account of two mammoth hogs on exhibition in Albany, with a crude engraving of one of them. The editor in referring to them states that "the sow is half of the Grass breed and the other half Welch. She measures nine feet nine inches in length, seven feet three inches around the body and weighs 1,137 pounds. Her age was two years and two months the 8th ult. Her pig was one year and two months old on the 1st inst. . . . He is very elegantly built and his weight is 946 pounds. It is believed by the best judges, should he live to be as old as the sow, that he will weigh at least 1,500 pounds. These two hogs were raised in the town of Nassau, county of Rensselaer,

by Robert Brown, who is an accomplished farmer."

In early times this Grass breed of pigs met with some considerable favor. Writing of this breed the editor of the Plough Boy says: "The Grass breed as we have it here, have short legs and noses, white sleek hair, small bones, and may be called a very comely, fat, indolent, good-natured sort of swine—a race of animals in which the devil would never think of entering for any mischievous purposes."

Various breeds were used in these early days that are now no longer in existence. Shepard says: "Up to 1832 these three, viz.: Parkinson (Bedford), China and Byfield, were beyond all question in the advance, although assisted more or less by the Spanish Black, African, Neapolitan, English White Suffolk, Angus and Dishley, Black Hampshire, Leicester, Short-legged and other breeds."

As emigration moved westward the various kinds of pigs kept company with the settlers, and with the development of the corn fields of the new Central West came a new impetus in swine husbandry. The census for 1840 and for 1850 showed Tennessee and Kentucky to be the leading states in pig production with Ohio, North Carolina and Virginia following after. Then Indiana, Illinois and Missouri forged to the front while the Southern states dropped somewhat in rank. With the settlement of Ohio came an apparent attempt to produce a type of pig that would be a better consumer of corn than had hitherto been the case. This resulted in the origin of the now well-known Poland-China breed, which first appeared in Warren and Butler counties in Western Ohio, the result of an amalgamation of Berkshire, Chinese, Russian, so-called Poland, Byfield, etc.

In these early days railroads were not common and pigs had to be driven on foot to market. Consequently

a strong-legged, vigorous pig was a necessity. If the corn corp could be driven to market in the shape of pork a very desirable end would be gained. The work of the developers of the Poland-China seemed to secure the desired results. No other breed equalled it as a corn consumer or produced a greater amount of pork from a given number of bushels of corn. It was through this that came the desire to

Grow more corn
To feed more hogs,
To buy more land
To grow more corn
To feed more hogs.

Since these early days the breeds have become established on a somewhat firmer basis, not only in this country but also in Great Britain. The number of breeds has become somewhat reduced, and organized associations have assisted in making each breed more firmly established in type and character as the years have gone by.

In the development which has taken place in America, but more especially in the States, the pig has become fatter, more chunky and shorter-legged; while across the water a longer-bodied, narrower-backed, longer-legged type has met with greatest favor. During recent years these two types have caused more or less discussion in the live stock world, and have been referred to as the lardy type and the bacon type. The advocate of the bacon type has had a hard battle to fight, because he has appeared before an unsympathetic audience. Where the Tamworth breed has been used as an illustration it has caused a smile with derisive word from the believer in fat hogs, and converts have been slow to obtain.

It is not my purpose to offer any plea at this time for a distinctive bacon pig, but rather to direct attention to some of the weaknesses of our present American breeds, with suggestions towards improvements. For this purpose I have no hesitation in taking for my illustrations any of the breeds producing the lardy type of American pig.

No wise man can but admit that one of the most essential features of the breeding animal is the capacity of reproduction. That breed which is weakest in fecundity is least apt to maintain a permanent hold in the

affections of breeders. In the breeding herd a large proportion of the profit must be derived from the increase. The sow that drops a litter of four pigs once a year, under average conditions is worth much less than the one farrowing eight. Animals of rather fleshy conformation are as a rule less productive of young than are those of leaner type. Common practice shows this. The beef breeds do not reproduce with the freedom of the dairy breeds. In the same sense the lardy pig does not reproduce to so great a degree as does the bacon type.

Unfortunately we have no statistics available to show the prolificacy of swine a quarter or a half century ago, but I have no hesitation in saying that the fat pig of today does not yield large enough litters. Each sow should farrow and raise after her first litter on an average eight pigs, and these she should be able to nurse properly for ten weeks or so. If the litter is smaller than eight, in my opinion the sow is not up to a high standard. In order to get some light on this question of size of litter the writer had an examination made of the total number of Poland-China pigs that were farrowed by many sows in 1880, 1885, 1890, 1895 and 1899. The following table shows something of the size of litter from a large number of sows. No pig averaged eight in the litter, and the average of one year for 500 sows dropped below 7. In 1887 an associate of mine at that time, Dr. A. W. Bitting, made a careful study of the size of litters of three breeds, viz.: Berkshires, Poland-Chinas and Chester Whites. A total of 2,083 litters were recorded, and it was shown by these that the average size of litter was 8.96 for the Chester White, 8.22 for the Berkshire and 7.45 for the Poland-China; while the Chester White litter raised averaged 7.62 pigs, the Berkshire 7.17 and the Poland-China 6.14 pigs of a total of 1,600 litters raised. These figures, which represent so many individuals, must be fairly representative, and are not as a whole indicative of the fecundity that is most desirable. In my travels among breeders of swine this subject of fecundity has been one of common discussion, and many unfavorable comments have come to my ears relative to the small litters so often far-

rowed. This criticism is an appropriate one, and in my judgment important. In certain regions of the Central West this criticism has been especially raised against the Poland-China, and I know of no other thing which is injuring the popularity of the breed so much as the criticism of weak breeding powers. This is not fancied, but real, and is a condition which just now is aiding in promoting the popularity of the Chester White and Duroc-Jersey.

It is a well-known fact that some animals and families are more prolific than others, and it behooves the breeders of pigs to study this matter of fecundity with more care, and to select out and maintain more high-class breeding sows in their herds. If it is worth while for light horse breeders to lay stress on speed records, and for Jersey cattle men to set a premium on cows that will produce 14 or more pounds of butter in 7 days, then a suggestion to swine associations along the record line will be appropriate. Why not establish a standard of fecundity for sows, an advanced registry as it were, giving special place of honor to the sow that will farrow say 10 pigs in her first litter, 12 in her second and 14 or more in her third? To be sure the wise breeder does not wish his sow to suckle 14 or more pigs, but it is easier to destroy the poorer individuals and reduce the litter to a number suited to the sow's capacity than it is to make up a deficiency. If the breeder would emphasize this feature, and would seek to breed fecundity in the pedigree, he would strengthen rather than weaken the value of the breed.

Another criticism which may justly be made of the typical high-fleshed pig of today is lack of constitution. While I am aware that some may take exception to this statement, there is logical reason for making it. As a rule thin-fleshed animals, including man, have more vitality than do those of the fat class. They are more active, get more exercise, have firmer flesh and more blood and stronger and larger vital organs. In feeding experiments in which foods productive of fat were compared with more especially muscle-making foods it was shown that pigs fed the former were defective in a measure in the amount of blood and capacity of vital organs,

compared with those eating the latter foods. Indian corn, the great staple swine food of the United States, is one of our most pronounced fat-forming foods and is no doubt in a considerable measure responsible for the change in type and character of the American pig. Through its use we have produced the most excessively fat type of pig known to the world, and this development has been undoubtedly to the disadvantage of the animal in constitutional vigor. No where is corn fed to pigs more than in the Mississippi Valley, and in no other region do we hear of such fearful fatality from swine diseases as in this. Generally speaking, where the constitution is strongest the ability to withstand disease is greatest. The pig which inherits the tendency to lay on fat to so great a degree as to always appear fat is not the best breeder, and is not the one we are most certain of landing in the market. One's success as a breeder or a feeder is not measured by the profits of one season, but by the average profits during a term of years. There are thousands of men in Indiana, Illinois and Iowa who have lost in one season from cholera nearly entire herds, wiping out the profits of years. While such a disease as this cannot be entirely averted it is safe to say anything which will give vigor to the herd will assist in repelling the disease and reducing its ravages.

This leads me to the point of suggesting that our farmers do not rely so heavily on corn as a feed, but combine with the corn more of the muscle-making, vigor-producing kinds of food. If part of the corn will be replaced with shorts or middlings, barley, oil meal or tankage profit will follow the change. Then if some of the sows of the shorter, blockier type are fitted for the butcher instead of being bred, and the rangier, deeper-bodied, not quite so wide-backed sows are bred, a more robust and I do not hesitate to say numerous progeny will result. Without question Indian corn is the most valuable of all cereals to the American stockman, and it is entitled to merit of high order, but our American hog stock has been fed thus far too exclusively upon it. While the railroad has materially lessened the need of driving pigs overland to market there are yet many feeders of pigs in this country who find it nec-

essary to drive five, ten or more miles to deliver their herds to the shipping yards or markets. In these cases plenty of constitution is also necessary. It is no evidence of vigor that in a drive across country pigs should keep dropping by the wayside exhausted and unable to continue along in the herd, requiring delay and later attention.

This leads me to another phase of this subject to which attention should be directed. As is well known, when in a natural position the pig stands on a foot which is divided into two toes. Between his toes and his ankle, which is known as the pastern joint, is a short space termed the pastern. Associated with the leg and back of the pastern joint are two small, abortive toes, commonly termed the "dew claws." When the pig is standing naturally he should be well up on his toes, the pastern should be strong and quite erect and only slightly oblique, and the dew claws well off the ground. When the latter are touching the ground, under fair conditions of surface, it simply indicates that the pig has not the strength of leg that he should have. It denotes a weakness of the muscles and ligaments of the leg and shows a broken-down condition quite inconsistent with the aims of the best breeders of the day. To illustrate how breeders view this matter examine the pictures used in advertising pigs and see how many of them show anything but straight feet, up on the toes, and the dew claws well off the ground. A too stiff-toed pig is undesirable, but such are rather uncommon. The broken-down pastern, however, is much more undesirable and is a clear indication of leg weakness. Further, the heavier the type of pig the more desirable the strong foot to bear up the weight of flesh. If one wishes to drive pigs to market the legs should be well made and strong, capable of bearing the journey easily. Not only is a strong leg desirable from the standpoint of utility, but if we consider beauty in the beast we get it in much greater degree in the pig standing up well on his feet instead of on broken-down pasterns.

Some pigs and some breeds are greater sinners in this respect than are others. All breeds are affected more or less with poor feet, but the plumper, quick-fattening, heaviest

ones most. Although comparisons are odious, no breed stands on poorer feet and needs feet improvement in this respect to a greater degree than does the Chester White. A personal investigation among pigs of this breed in search of breeding stock with years of experience in breeding them and comparing with other breeds, convinces me of the truthfulness of this statement. Further, not to offer this as my own opinion entirely, more than one breeder of Chester Whites in by presence have agreed to this statement. Still further, in the year 1900 or thereabouts one of the most famous breeders of Chester Whites then living, a man who has done more to advance the interests of the breed than any one else of whom I know, in correspondence with me agreed that the Chester White was the worst of our breeds in this particular respect. In view of this fact Chester White breeders should make unusual efforts to remedy the defect referred to. That it may be done there is no doubt. Careful selection must be practiced and herd boars of very superior bone and form, that stand up well on the feet, should be used. Further, brood sows of the right sort as near as possible should make up the herd. This difficulty of broken-down pasterns is usually associated with animals that have been forced very rapidly while young, and so have acquired too great a weight for the feet to support properly; but the fact still remains that there is inherited weakness more often than not in the pig in this respect. Another quality which the modern pig lacks more than he should is a good strong bone. The food plays an important part in giving strength to bone, but unquestionably the pig of today has inherited too great a share of this weakness. No other farm animal, in proportion to its size, has to support so great a weight as does the pig, consequently a strong leg bone and good foot carriage is a necessity. To secure it the breeder must do two things: (1) Breed with strong-boned animals. (2) Feed more muscle and bone-making material.

No plea is here being made for coarseness, but for quality and strength. Among well-bred herds of today coarseness is exceptional, while too much refinement is far too common. If one questions this let him

go into a herd of pure-bred pigs of any of the more prominent breeds and note the way they stand up on their feet, how small the shank bones are and how poorly they support themselves.

Food will help materially in this matter. Prof. Henry, at the Wisconsin Station, in studying the effect of food and mineral matter on bone conducted interesting experiments on three lots of pigs. One lot was fed corn meal only, another was given ashes with the corn in separate box, and another bone meal with the corn. Without discussing the influence on general growth it will serve the purpose to refer to the influence on the strength of bone proper. The thigh bones were tested in a machine in the mechanical laboratory to measure their breaking strength. As a result of two feeding trials of 84 and 112 days respectively it was shown that to break the thigh bone, where corn meal only was fed it required 301 lbs. pressure, where ashes were fed 581 lbs., and with bone meal 680 lbs. In other words, by feeding bone meal the strength of bone of the hog was more than doubled. Not only that, but there was about 50 per cent. more ash in the bones of the hogs receiving bone meal or hardwood ashes than in the bones of those not so fed.

In another direction, a criticism may be made of our fatter type of pig, which is that, at least with some breeds, many individuals seem to fatten rapidly up to a certain period and then stop growing, excepting very slowly. More than one feeder has found that his pigs would fatten from three to five or six months, and then seem to reach the limit of profitable growth. The pigs would remain attractively fat, but the progress of expansion seemed sadly curtailed. This is no imaginary condition. Such inability to continue growth has its unfortunate phase in a slow, dragging development with breeding animals.

As leads me to say that our method of treatment must be different if we are to maintain to high standards some of our present breeds. A pig should keep growing and expanding in a noticeable, desirable and profitable manner for at least 18 months. At one year of age he should weigh at least 375 pounds. We should be able to get a weight of 225 pounds at six months of age, and then if it is

not desired to sell he should keep on growing. The question may be seriously raised, if the mature brood sow of today is not under-sized and too small in frame. Those who remember the Poland-China of 20 years ago cannot but note how much smaller matured females of today are in the comparison. And if the figures were available it is my opinion that it would be shown that the litters of today are much smaller also.

In the desire for excessive fat so characteristic of the American feeder has come much more of injury to our breeds than many realize. It has resulted in producing the fattest hogs on earth, and we have gone so far that consumers object to the large proportions of external fat on the carcass. Lard, once almost the only grease available for standard use in cooking, has been very much replaced by the use of vegetable oils. The demand for lard is not as relatively great as it once was. In the packing houses one will see workmen slicing off long strips of external fat from heavily-fatted pigs, in order to place the meat in the most saleable condition for the consumer. Our American pork also as a rule is so fat that we are unable to get a foothold in the European markets, excepting for hams and a limited amount of fairly lean meat. The mass of people in Europe demand a class of bacon and pork which is reasonably supplied with meat.

It is not my purpose here to advocate the use of the so-called bacon pig, but will it not be essential for our future success in the swine industry to secure in our American breeds some of the good qualities of this bacon pig? The bacon pig is prolific. This quality is desirable in any breed.

The bacon pig is as a rule active and vigorous. These are desired in any breed. The bacon pig makes high-class bacon. This is valued in any breed. The bacon pig has strong bone and stands up well on his feet. These qualities are valued in any breed.

An American breeder of swine is favored with his share of human intelligence, and he has the ability to improve the pig within all reasonable bounds. It will not be necessary for him to introduce the bacon pig as a panacea for his ills, but by judicious selection, careful breeding and sensi-

ble feeding he will be able to so develop our present breeds as to meet with all reasonable demands. In this connection too great stress cannot be laid on intelligent selection and breeding. When this is properly followed up the desired results will be secured. In the meantime we must not mislead ourselves in the belief that what we have is all right. No true breeder ever reaches his own ideals, and he who secures the greatest success can only attain it through the most persistent effort, making use of every legitimate means at his command.

Discussion.

Mr. Lantz: I would like to ask whether Professor Plumb considers our winter wheat bran a good feeding ration for growing pigs?

Professor Plumb: Personally I would not advocate the use of bran for pigs, for the reason that anything of a chaffy character like bran is undesirable for growing pigs, and is better suited for the breeding sows. I should prefer to feed middlings or shorts rather than bran which has almost the identical feeding value. It is so much smaller that it will not irritate the digestive tract of the pig and will not cause the trouble that bran will.

A Member: My experience with hogs has come largely from the market. I have been advocating that we shall breed what the market demands. The market demands a fat pig quite short legged, with the lowest possible total waste, and the American people have been breeding for just what the market demands. The question for the breeders today is, how to keep out the waste and maintain a high percentage of meat and yet have the fecundity.

Professor Plumb: I am not presenting an argument for bacon hogs. There are two types of hogs that belong to the fat class in the United States. I am talking to the market man as much as to the breeder. My paper has also a direct application to the feeder. The pigs of the Poland China type in particular and also the Chester White have broad backs and quite long sides. An inverted pear shape is a rough illustration. You take the Berkshire which stands half way between the present exaggerated type of Poland China and the bacon hog and it has a back which is not

extremely broad, and has a deeper straight side and a straighter line on the back. I would not hesitate to say, knowing something of the Chicago market, that a carload of pigs of this middle type which is neither extremely fat nor of the high bacon type will receive just as high price as in any market. One of the Swifts of Chicago stated that if a sufficient quantity of these pigs could be shipped into Chicago at one time they would receive a higher price. I have been on vessels which carried dressed meats and live stock and have seen any quantity of light pigs, 50, 75, and 100 lbs. dressed. I have been in the packing houses and have seen them getting out a certain lean type of pig which was being killed and run off for export. I am not arguing in behalf of the bacon pig, but we may be going to the other extreme—making pigs too fat in order to make a little money. I think the breeders' associations to today have a particular duty which as a general rule they do not see and I thought this a good place to introduce the subject.

A Member: Has Prof. Plumb ever fed tankage or dried blood?

Professor Plumb: I have fed a ration to a brood sow of a mixture of half cornmeal and half middlings and have also used in connection with it within the last few years a small quantity of tankage. Another thing which is used is dried blood or a certain class of meat which is a refuse from packing houses. In cities like Pittsburg and some of the larger cities East, I am sure the slaughter houses make a certain class of material which has been cooked, for feeding the brood animals. The blood should be heated up to a certain temperature, otherwise there is a possibility of causing disease. Tankage is of value because it has been through the cooking process and there is no liability to this trouble.

I have bred the Yorkshire pigs for two or three years and have crossed with the Poland China and have never seen a better class of pork than was obtained. I have also crossed a Yorkshire on a Berkshire with somewhat the same result.

Mr. Henry Palmer: I didn't think there was anything for a Tamworth man to say when the Professor got through. I have been breeding the Tamworths for four years and am well

satisfied with the result. I think that if we give them the corn diet we will get all the fat required. I had one litter of pigs, the average weight of which when 205 days old was 214 lbs. dressed. The heaviest weighed 236 lbs. These were not forced with an idea of making heavy weights. I don't claim that no other breed would make these figures but I do not think that any other breed would make a more saleable hog. As for the size of the litter, that is usually all right. We generally have more than we can raise. I had five that dropped their pigs this fall averaging thirteen and a fraction; two, averaging fifteen; others averaging sixteen, nine and eleven.

Mr. Norton: I have not experimented with the Tamworths in crossing with the Poland China but have with the Berkshire and can produce as fine a pig with this cross as can be found. Last fall, I had a litter averaging 160 lbs. the day they were five months old and I never fed them over two quarts of cornmeal and skim milk. I don't like the Tamworth except as a brood sow. One which I had has produced an average of 10 pigs to a litter, and now after three years as a brood sow is a success. Also as a runner she is a success.

Mr. Smith: Would you advise using any of the prepared foods for hogs?

Professor Plumb: I would not recommend the use of any of the condimental foods (1) because they are high in price and out of proportion to their true value; (2) because in some cases I prefer giving medicine

to my stock rather than to give something I do not know anything about. of condimental food for pigs. I would mention station they would send you a bulletin on the condimental food for stock, detailing the results of the use of condimental food for pigs. I would also state in this connection that one or two other examinations have been published. I know of no results in the use of these foods that have been as good as in those obtained in the use of non-condimental foods.

Professor Plumb: Just one thing more; we Americans are the queerest people in the world; we want the Philippines, Cuba and other territory and we say that the world is our market, but with the American hog we are peculiar; we say we don't care anything about our sale of it. In 1900 I made a trip to the other side of the water, and spent some time in Denmark, where an immense number of bacon hogs are fed for the British market. I spent also some time among the butchers of Smithfield. It is an interesting thing that in the larger cities across the water you see produce coming in from all parts of the globe. I was told by one of the butchers in the Smithfield market that we Americans are terribly independent people; that we say, if we cannot sell our pork to one party, we can to another. The Canadians ask what the market demands, and supplies it. Little Denmark is today controlling the British market for pork and for bacon and we here in the United States with our immense droves of hogs have to restrict ourselves almost to our own territory.

Fundamental Principles of Breeding.

By Watkin G. Powell,

of Shadeland, Pa.

The programme for this evening, I find, is quite different than I had supposed. I had expected from the published announcement that somebody was to precede me with a written address and I simply to lead in the discussion to follow. But I learned only a few hours ago to my great surprise and disappointment that nobody was

to precede me. I am not prepared with a set address or as I would like to be. And I will add, not as I would have been, had I known what was expected of me. I relied upon the expected address to suggest the points to be discussed. As it is I will attempt only reference to some of the recognized principles of breeding as

they may occur to me as I proceed.

Allow me to caution you, however, that you must not expect I will advance any new principles of breeding; for there are no new laws of reproduction. The laws of heredity are fixed and immutable, and as old as the immovable and everlasting hills. All that we can now hope is the better understanding of these laws and the better to apply them.

The question of reproduction is a very mysterious one in every consideration. In fact all nature is a mystery. We look about us and observe that the grass grows. Can any of you tell why it grows? We see the trees bud forth and after a season the leaves fall, and this repeated on year after year. By the side of the deciduous tree, nourished by the same soil stands the evergreen, from which the leaves do not fall. Why is this so? Side by side, and under the same conditions, we find the odorless and the fragrant flowers, each seemingly in like degree of perfection. Explain all this if you will.

None of you will say that you do not believe that these things are to simply because you do not understand why they are as they are.

Therefore I would say that we should be careful and not conclude that there are things in the matter of animal reproduction that we will not accept or believe simply because we do not understand them. That would be on par with that of the anti-religionist whose principal argument is that he will not believe because he does not understand; that he cannot reason it out. The same position will apply to nature; and we would be incredulous indeed if we would accept as true only what we can understand.

"Breeding" is more generally considered as applying to animate nature and in that direction has most attention been given. However, more recently much attention has been paid to the improvement of vegetable and plant life, which is nothing more nor less than breeding.

There is a flourishing association in the West of the breeders of seed corn, and it is claimed that already important results have been accomplished. It is believed that in time—It is believed that in time—a comparatively short time—it will be possible to produce different breeds

of corn each differing from the others in disirability for different purposes as fully as we have produced different breeds of our domestic animals; that some of these varieties or breeds of corn will produce a greater amount of fat, others of protein and still others will excel in other respect, just as we have live stock especially suited for various purposes, as the milk breeds for the dairy, the beef breeds for the block, etc.

All this emphasizes most forcibly the influences and effects of intelligent breeding in any line.

But by "The Fundamental Principles of Breeding" as named in our programme for discussion at this time undoubtedly reference is had more especially to their application to the reproduction of our domestic animals. It is not necessary to refer to the vast importance of our domestic animal industry. All admit that.

The exact origin of each kind of our domestic animals, while of great interest, is not so important to us now as their improvement, however well we would like to know their precise origin.

There is no question as to the great antiquity of their ancestry. No doubt they existed long before the human family. The horse, cattle, the fowls of the air and the fishes of the sea, we find referred to in the early history of the world. After their creation man was made.

We have just heard one of our domestic animals (the hog) most interestingly and learnedly discussed. One thing, however, the Professor did not tell us,—why it is that hogs all turn their tails to one side, and most of them to the same side. Now why is it? I do not pretend to say why it is, but there is a cause. Possibly it came originally from accident, and we have been breeding on for ages with the tail turned to one side until it has become a fixed characteristic. But if we cared to do so we could breed out this tendency.

We find the same peculiarity in dogs, most curs and mongrels turning their tails to one side and generally to the same side. But by careful breeding this tendency has been so far eliminated until now in most kennels of the full-blood dog of most breeds the turning of the tail to one side is considered a disqualification.

We have the horse,—the great

ponderous draft, and the little Shetland pony, probably from the same origin, results of breeding. We have the trotter and the pacer produced from similar or the same crosses, but doubtless from ancestors, perhaps however quite remote, of different accidental, educated or natural tendencies.

So, too, we have the different breeds of cattle, probably from the same origin, although just what our cattle descended from is a mooted question. Some advocate that they came from a wild species similar to the buffalo, while others contend that there are anatomical objections to this theory and that they sprung from a wild race more nearly like what they are at present. There are even yet or were comparatively recently a few specimens of a wild breed of cattle in some of the preserves in the old countries that possibly are of older origin than our domestic cattle, and from a similar source may have descended ours of today.

But how are we to profit by the lessons, and what are we to learn from the observations and experiences of the past? What applications can we make of their teachings as relate to the ever interesting problem of reproduction? It is breeding that has produced the marked difference in animals of the various classes.

It is an old and trite saying that "like produces like." Considered in the light in which it is so often misapplied it is not true. We take for instance two animals that are similar in conformation and breed them together and perhaps get something unlike either, because the ancestors of the animals were unlike. But the maxim "like produces like" considered in its broadest sense as applied to breeding is in a great measure true. Like produces like when we have uniform characteristics in all of the ancestry back as far as their influence may extend; but even then we must take into consideration the hidden influences of surroundings, circumstances and conditions.

We have all observed the marked similarity among the birds and wild animals of the different kinds, the result undoubtedly of similarity in the ancestry, and also in a measure owing to similarity in conditions. That same principle carried out with our domestic animals would bring the

same results. To produce uniformity we must have the same characteristics in the animals themselves, as also the same tendencies coming down from both sides.

Dr. Elwood Harvey gives the following apt illustration. While on one of his visits to a patient he noticed on a farm a drake with a single feather of the color of a breed of ducks formerly in that section of the country, but then supposed to be entirely extinct. He bought the drake and a duck from the same brood and bred them together and then their descendants with the result that he actually reproduced, or perhaps I should say restored, the breed with all its original characteristics. It is an interesting and forcible illustration of the effects of inbreeding. We find with people too, manifestations of like influences and tendencies. It is not uncommon to see a family dropping off one after another even in early life from pulmonary or other diseases and yet the father and mother both living on to good old ages. Such cases are frequent and undoubtedly owing to the same tendency in both parents. Tendencies too are intensified by inbred blood relationship.

The same rules apply also to physical traits. A good illustration of this is found in the oarsman Hanlon. His father was light-house keeper and a dexterous oarsman. The mother was accustomed to row out to the light-house with the father's meals. She, too, became so expert at the oar as almost to defy wind and weather. Finally to them a son was born. He grew up amid these surroundings and in this practice and later became the champion oarsman of the world. This was undoubtedly to a great extent the result of inherited instinct and skill the habits and practices by both the father and mother.

Acquired and educated characteristics too are liable to be transmitted though not to the extent as inherited tendencies. Not only should we have in breeding uniform characteristics but uniform temperaments. We should also breed for brain and nerve force especially in animals intended for use in our exercise and pleasures. A dung-hill so called may out-run the Thorough-bred for a short distance, but lacking in nerve force he soon tires and "quits" while the Thorough-bred will run on for miles. Animals

with brain and nerve force have too, not only greater strength and endurance but also more courage than common cold-blooded animals, consequently are safer in emergencies. Many of the so-called "safe family horses" lack nerve and may easily and unexpectedly lose control of themselves while those of better breeding and more courage might not move under the same circumstances. So in breeding we should not alone consider physical formation but also brain disposition and intelligence.

Bear in mind that faults and defects, if characteristic, are quite as apt to be reproduced as desirable traits or tendencies and are intensified in the same manner, so especially avoid inbred weaknesses. Remember that a chain is no stronger than its weakest link. So with an animal. If there is a weak point that is the point by which to judge of its merit.

In correcting defects do not attempt to do so too violently. One animal may have a defect in the opposite direction; a horse, for instance, may be too high in the back, or roach-backed as it is called, while another is low or sway-backed. It is not well to undertake to correct either fault by breeding these together. It is safer and surer of favorable results to cross either animal with one correct in form. Opposite winds may produce a hailstorm but seldom to any good purpose.

In breeding, too, it is essential to consider whether the defects it is desired to remedy are in the sire or in the dam. Do not overlook the fact that, as a rule, the sire to a greater extent influences the extremities of the offspring, while the dam more generally controls, to a greater degree, the bodily formation. We find a marked illustration of this theory in the mule, produced by crossing the jack upon the common horse, with the result that we get an animal with the head, ears, limbs, feet, tail and even voice those of the sire, but with the body in size more after that of the dam. Crossed the other way we got what is called the hinny, a pony-sized animal with the head, ears, limbs, feet, tail and even the voice all like those of the horse, but the body, in this case, as in the other, more nearly resembling that of the dam. Likewise the sire more strongly influences the action. Far better results

are attained from trotting sires and running dams than by crossing the other way.

The same principle holds true in the breeding of cattle. Breeders of polled cattle have found that their success has been far greater by the use of polled sires and horned dams than the other way. And as singular as it may seem, results have proven that even in the production of milk, it is more important that the sire be of a deep milking strain than even for the dam.

So always keep in mind these recognized and established principles for the correction of faults, for successful breeding consists no less in eliminating defects than in reproducing desirable qualities.

Should you ask me to suggest what to breed, as well as how to breed, although this is not a part of my subject, the whole question could be covered by the simple answer, "Breed what you want." And the chances are that if you do it intelligently you will produce it. First consider your tastes, because you will take more interest and your success more probable, in what you like. Consider too the conditions your means, your surroundings, your advantages and disadvantages. Consider also your object in breeding; if mainly for your own use, what you propose to do with the surplus; or if for market what are your facilities for marketing.

Then when you have determined what to produce, select animals nearest to your ideas and breed accordingly. But do not under any circumstances, breed at random. Any breed is preferable to no breed. Shun grades and mongrels, especially as sires, from ancestry dissimilar in form, size, characteristics and tendencies; not only for satisfactory results, but also for safety. It is from just such sires as a rule spring our deformities, enormities and monstrosities; seldom from sires of uniform ancestors.

Avoid too, sires of extreme size. Advertisements are common of horses weighing so many tons. Do not be carried away by any thing of the kind, even though you may desire to breed as much weight as you can in a well proportioned animal. How much of this claimed extreme weight is made up of worthless, or worse than worthless, fat? I have known the

same horse of matured age to vary in weight more than seven hundred pounds, the difference being produced entirely by flesh and fat, and he was a far better horse at three to five hundred pounds below the outside weight than at that extreme. Always consider whether the heavy weight is the reasonable full weight of the breed. If it is not let the animal severely alone as a sire. You will ordinarily get far better results to breed to a sixteen hundred pound horse than to one weighing a ton if the former is up to the reasonable full-size of the breed.

Do not run off after some craze or fad. Either is generally without established merit and usually is short-lived, and may prove of irreparable damage by upsetting all that you may have already accomplished.

In nothing is careful consideration, close observation and the exercise of good practical common-sense more necessary than in successful breeding; I am sorry to say as a rule, in nothing are these more lacking than in breeding as too generally practiced.

But until we get our domestic animals up to a greater degree of uniformity we must, at best, be prepared to expect some disappointments. However, there are fewer now than formerly and they are becoming fewer and fewer as we progress.

Hidden influences, too, such as surroundings, conditions, both mental and physical, as also accidents, &c., do and will affect results to a greater or less extent, as is evidenced by the fact that twins as a rule closely resemble each other, while oftentimes full brothers or sisters to them of different ages are distinctly unlike. But the greater the similarity in the characteristics and tendencies in the ancestry the greater resemblance in the offspring may reasonably be expected not only in appearance but also in temperament, disposition, &c.

Notwithstanding the occasional failures and disappointments that do and will come even after the greatest pains and strictest observance of recognized principles, it is most gratifying to know that we are making vast advancement in the improvement of our domestic animals; that through careful and considerate breeding the failures are fast becoming the exceptions, not the rule; that the hopes of

yesterday are becoming the expectations of today; and let us believe that, as the years go by our disappointments will be come less and less frequent until, let us hope, that the anticipations of the present will become the reasonable realizations of the future.

In our breeding let us carefully select our animals as nearly to our liking as we can, with as uniform characteristics and tendencies as possible, never losing sight of the one essential, indispensable rule;—the one great "Fundamental Principle" that nature courts uniformities but shuns antagonisms, and our success is assured.

Discussion.

A Member: I should like to ask why breeders of beef cattle pay more attention to the remote female ancestor than to the immediate male ancestor, and why dairymen pay more attention to the bulls than to the females in the pedigree.

Mr. Powell: It is a generally accepted theory among breeders that the male influences the extremities and also the production of milk more than the female, and that the female influences bodily formation and meat production. I think this theory is really founded upon results.

Mr. Bayard: I have been surprised at the high prices paid for common beef bulls because they were of some fashionable family. I have seen much better ones sold in the same ring for less money. It seems to me we are making too much difference in price in cases of these remote ancestors.

Professor Plumb: A part of my business is studying the breeding question. That is one of the things I have to teach in the Ohio university. I think it is a wrong conception to hold that the perfection of the beef animal depends upon the female, and that of the dairy animal upon the male. You will find that these qualities depend largely upon the family. It is a difficult thing to establish upon absolute facts that certain qualities can be secured any better from the male than from the female.

Mr. Bayard: I agree with Professor Plumb, but at the same time, the condition exists. I have one heifer of a fashionable family named for a cow which is seven generations back

in the maternal pedigree. I have another sired by one of the greatest bulls of the breed, but not fashionable family, and I can get twice as much for the first as for the last, though she is not as good individually. I claim that too much attention is paid to remote female ancestors, and that we are going crazy over the family business.

Professor Plumb: As an illustration that the pedigree craze does not always indicate good judgment on the part of the buyer. I have known of cows bought for fancy prices on this basis which never produced calves.

Mr. Powell: We have to be governed by the people with whom we have to deal. At the same time I would say, don't overlook individual merit. It is the same with the trotting horse; one animal will sell for a thousand dollars with a certain record. Another animal with the same record, but of different breeding will sell for three or four thousand dollars. We have therefore to take into consideration somewhat the kind we believe in, and must have reason for our belief. It is true, however, that our buyers and our breeders go pedigree crazy sometimes. You will find the same thing applies to the question of cattle. The people will have a fad, and you cannot breed it out of them any more than you can breed it out of the animal.

The President: We know that some of the most wonderful animals in horses and cattle have been produced by inbreeding, but it is a question, I think, whether the ordinary farmer does not ruin more cattle by inbreeding than by out-crossing. I think with breeders it is different; they study the crosses; but, the or-

dinary farmer often makes a great mistake.

Mr. John I. Carter: We "ordinary farmers" make mistakes in breeding and in almost everything else we do, you know.

The President: There is no necessity for it.

Mr. Lantz: When you talk about pedigree you touch me at a tender spot. We are entering again in this discussion somewhat into the deep waters of the science of breeding, and I want to put myself again on record as a strong advocate the firm deliverer in pedigree in the advancement, development and improvement of our breeds of live stock. Some years ago our farmers in Pennsylvania began, and are making a mistake today, in continually crossing breeds. After they got a number of them started they began crossing types and families; families of the same breeding but of opposite characteristics. I do not believe we can lay too much stress upon pedigree when pedigree and the different stock represented are thoroughly understood. I do not believe we should breed opposite types or characteristic or families that are too much opposed in type and form. If we do not make a study of pedigree, I would like to ask by what are we to be guided that we may select the desired families and types of a certain breed not too opposite to produce the desired uniformity?

Adjourned to Thursday, Dec. 11th at 1:30 p. m.

Second Day. Afternoon Session.
The meeting was called to order at 1.30 by the President, the Hon. W. C. Norton.

Better Practice in Breeding Our Farm Animals.

By Prof. C. S. Plumb,

of Ohio State University.

A few weeks ago it was my pleasure to visit a farm where 300 head of steers grazed on rich pastures. There were many fine specimens among them, but it would have been difficult to have found even one that

could have been selected out and fed with a knowledge that it would prove a winner in a show ring against picked individuals of his own kind and class. There were little defects here and there among this bunch of really

beautiful steers, that scored each individual below perfection. It might be a droopy back, or a slackness behind the shoulder, or not the best sort of a rump, or some other fault, but there was a fault.

Our last census, for June 1900, reports almost 69 million head of cattle in the United States. How many of these, think you, would do to go in the show ring? Or going to the other extreme, how many of these, think you, ought never to have seen the light of day?

One familiar with our farm animals, who has carefully studied animal form and its relation to production, cannot but feel and realize that an unfortunately large per cent. of the animals on our farms are inferior in character and quality, and in far too many instances do not pay for their keep.

If one will but look with observing eyes, he will note two facts. First, that of the farm animals with which he comes in contact, but few are creditable or even good specimens of the breeder's art. Second, that the live stock and agricultural press publishes many contributions on feeding, and but few on breeding. There are men today in our experiment stations who have become famous for their investigations in feeding animals but there is not one name among them yet, where fame has been secured as a result of breeding experiments.

You will readily understand why this is so. How it is apparently easy to feed, yet what time and patience and study are necessary to breed aright. Yet, I address you today, on the assumption that a knowledge and an application of the principles of breeding are as important and fundamental to success in producing farm animals, as is the necessity for a good foundation under the structure the architect is planning. Of the two things, breeding and feeding, the former is the more important, for it acts as the sub-structure upon which successful feeding rests. To the great breeders of the past are the breeders and feeders of today indebted for all the best that exists in our present flocks and herds.

What would our live stock of today signify, had not Bakewell, Collings, Bates, Booth, Cruickshank, Ellman and Webb glorified the past with their achievements! Think for a mo-

ment of Bakewell, and his labors of over a century ago! Reared among a class of animals that did not impress him as either beautiful or profitable, he began a study of animal life and force that has had no parallel in our live stock history. Careful selection, mating and breeding, were pursued with persistency, covering many years of time. Bakewell had his ideals. He sought individuals that approached those ideals as nearly as possible. He had learned that like produces like. His methods were far reaching. He studied not only the living forms, but history tells us that he made studies of the slaughtered animals and preserved in pickle parts of the carcasses for comparison in future years. Bakewell began his work a subject of ridicule. Yet he lived to see the day when mankind paid just tribute to his greatness as a breeder. The English cart horse, Longhorn cattle and Leicester sheep were improved and distributed widely by Bakewell. He introduced the system of letting out males for breeding purposes, and it is stated that his income from breeding males in 1789 which he let out to service, amounted to \$30,000, for the season. Bakewell was a remarkable man. He more nearly than anyone else is the father of our modern stock husbandry. No such study of the influence of breeding had been attempted prior to his time, so far as history teaches us. Others have followed Bakewell's lead, so that today, the influence and inspiration of these master breeders is beyond calculation. In writing of Jonas Webb, Elihu Burritt expresses well the significance of the work of such a breeder as he.

"But what higher honor can attach to human science or industry than that of taking such a visible and effective part of taking such a visible part in sending out into the world successive generations of animal life, bearing each, through future ages and distant countries, the shaping impress of human fingers, long since gone back to the dust; features, forms, lines, cures, qualities and characteristics which those fingers, working as it were, on the right wrist of Divine Providence, gave to the sheep and cattle upon a thousand hills in both hemispheres? There are flocks and herds now grazing upon the boundless prairies of America,

the vast plains of Australia, the steppes of Russia, as well as on the smaller and greener pastures of England, France and Germany, that bear these finger marks of Jonas Webb, as mindless but everlasting memories to his worth. If the owners of these 'well creater things' value the joy and profit which they thus derive from his long and laborious years of devotion to their interests, let them see that these finger prints of his be not obliterated by their neglect, but be perpetuated forever, both for their own good and for an ever living memorial to his name."

In the results of the work of the breeders during the past century, there is much that is not understood, but there is also much that is understood. The law that "like produces like," has a significance and an importance that only the host of stupid could misunderstand. This may be fitly termed the one great law of breeding, through the application of which has resulted much of the best in our stock of today. Our knowledge of breeding is the result of constant observation, and the gathering together of facts from this breeding, the use of which has taught us how to the more intelligently mate animals. Today the wise breeder seeks to maintain animals in his herd, of uniform, superior qualities. A blocky, low down, broad backed, deep bodied, thick fleshed bull, mated to cows of this same sort produces offspring as a rule that resemble the parents, or are perhaps something of an improvement on them. This great law is well illustrated in many ways about us. The peculiar and uniform color markings of the different breeds, the distinctive conformation or shape of certain classes of stock, and the temperament of others, all reproduce with great uniformity.

There is one interesting quality which comes within the action of this law, and that is what is known as prepotency. Certain animals have such superior strength of character that they reproduce in their offspring much of the same character seen in themselves. This is best seen in cases of males, where the offspring resembles the sire in a pronounced manner, and is usually due to the fact that he is somewhat better bred than the stock he is mated to. Many striking examples of this occur among great

sires. The Hereford bull "Lord Wilton" was very much given to impressing his special character to his offspring. A few years ago when on a visit to Lexington, Ky., the stallion "Bermuda" was fetched out for my examination, and along with him were also brought four of his sons and grandsons. In conformation, style and color, the descendants of the old horse all bore him a striking resemblance, and testified to his great prepotency.

But this great quality of prepotency is not limited to mere external things. It is seen in the swift speed of the race horse, in the brimming milk pail and pounds of butter, and in the thick loin of beef. From the loins of old Rysdyk's Hambletonian (10) has sprung a lineage of speed that has astonished the world for his children and grandchildren and great grandchildren have performed phenomenal feats upon the race course. The fastest trotters the world has known trace their pedigrees back to that of Hambletonian (10). The blood of the Holstein bull "Jacob" traces down through generations of great milkers, while it is claimed that over 90 daughters of the Jersey bull "Exile of St. Lambert" have records of 14 pounds or more of butter in seven days. And if we turn to flesh production, we find that through the blood of Mr. Cruickshank's "Champion of England" come some of the greatest Shorthorns of the last quarter of a century. These are simply illustrations to show that blood will tell, that individual merit and prepotency are qualities that continue paying a rich reward down through the generations.

And so I wish to make a plea that our stockmen study the subject of breeding with more earnestness and make it play an important part in their business. This is not an appeal to breeders of pure bred stock alone, but to all persons who find it a part of their business to breed horses, cattle, sheep and swine.

The question may be asked, is this a business proposition, and is there money in it. This I will endeavor to demonstrate in a further discussion of this subject.

What I wish to impress upon you right here are a few facts bearing upon the reproduction of animals. I have already stated that there is a well established law that "like pro-

duces like." It is also true that if two animals are mated, that are very much alike in character, the offspring will more or less resemble each parent, but if one parent is inferior and the other superior and prepotent, that the offspring will resemble the more prepotent of the two. While the males stamp themselves most on the progeny, because they are generally selected with more care than are the females, if an inferior male is mated with a superior female, the offspring will tend to resemble the dam. This is well illustrated in the case of Berry, who had for some years in his possession a breed of improved red pigs. His sows of this breed crossed with common boars, almost invariably produced litters of pigs of this reddish or sandy color.

As a rule it is injurious to breed immature stock, and the best returns are not expected from weak or very old animals. Both observation and experience have convinced me that the use of a ram lamb for example, as sire in a flock, results in lambs lacking character, and of uncertain quality, while the use of a matured ram would have given satisfactory returns.

There is a general tendency, in the anxiety to secure results from breeding herds, to breed the females at too early an age, which too often injures the vitality and growth, and promotes reduced size and quality. Animals should not be required to take on themselves the burdens of motherhood, until they have acquired fair maturity and development. The man who breeds his ewes to first lamb as long yearlings, to have his beef cows first drop calves at 30 months old, or his dairy cows at 24 or 26 months, or his sows to first farrow at 12 or 14 months of age is on safer ground in building up his herd, than the man that will not wait for this maturity. In a measure, there is also objection in using very old or weak animals for breeding. Strength of character from such cannot be expected to equal that from animals in the prime of age and condition.

The thoughtful breeder must consider carefully the inheritance of his stock. Animals of old, well established breeds, reproduce themselves with more uniformity, and with less trouble to the breeder than do the breeds of more recent development. The Polled Durham of today must not be

expected to reproduce polled heads with the uniform regularity of an old breed like the Aberdeen Angus. This leads up to the point where it may happen that horns appear in the offspring from polled sire and dam. This peculiar quality or the occurrence of characters which existed no nearer than some grandparent or even still further back in the ancestry, is called "atavism" or as the breeder sometimes expresses it, "throwing back." The scurs or horns which appear in the calf, have cropped out from some generation beyond the immediate parents. And this cropping out shows that the breed yet lacks stability of character. A good example of this same quality of atavism has come within my experience during the past few years, in breeding Buff Leghorn poultry. This is a recent breed and even though one uses Leghorns of good buff color down to the skin, white feathers or brownish black feathers will occur in the chicks hatched from this mating. But by breeding good typical buffs, with no off colored feathers, each generation will prove an improvement on its parent stock in this respect. This quality of atavism has long been recognized, and the careful breeder will give heed to its warning. The man who deals in pure bred polled cattle cannot afford to use in his herd, breeding stock that have thrown horns, if he is working to intensify the polled habit.

Largely as a result of the studies of Darwin and the modern scientists, it has been shown that the various parts of the animal anatomy are more or less related to each other, and that the excessive development of one part is usually at the expense of another part or organ. Excessive milk production is at the expense of flesh production. The food of the dairy cow is converted into milk rather than into flesh and fat. The general purpose cow need not be expected to be either a large milker or a quick flesh producer, while in general experience, the thick fleshed, meaty type of beef animal produces too often not enough milk for its own progeny. The two minute trotter carries just as little flesh as health and vigor will permit, while his every development is in the direction to produce speed, as shown in the lithe, muscular body, and the clean cut, fine bone and limbs. The contrast between the fleshy form of

the heavy draft and of the light weight of the trotter is very striking and shows to good advantage how one development, that of speed, is at the expense of another development, that of weight and flesh. Excessive wool production, as seen in the Merino sheep, seems to be at the expense of flesh production, although the wool of any breed, through careful selection may be improved in length and fineness of staple. These facts simply teach us, that if we are wise we shall find it necessary as a rule to develop special qualities of animals, to meet special needs, rather than all needs. The general purpose cow may be a profitable animal for you to keep, but you need not expect from her the intense beef habit, nor that of milk production, though she may make a very creditable showing.

Another characteristic that some breeders should give more attention to is that of fecundity, or the ability of an animal to reproduce its kind. In the breeding herd the value of an animal largely lies in its worth as a breeder. The owner of a sow that farrows 12 pigs, has much more cause for congratulation than the man who owns the sow that farrows three or four in a litter. The habit of being prolific seems more characteristic of some breeds and individuals than of others. Dorset sheep have for a century been famous for the number of lambs they drop in a year, often lambing twice, and this is recognized as a breed characteristic. The fatter, lardier types of pigs usually produce small litters and the leaner types large ones. Still, some of the fat breeds produce somewhat larger litters as a rule than do the other fat breeds. In a study of this subject among breeds of hogs, Dr. Bitting of Indiana Experiment Station, compared 400 litters of Berkshires, 1086 litters of Poland Chinas and 600 litters of Chester Whites. These showed an average of 7.45 Poland China pigs per litter, 8.22 Berkshires and 8.96 Chester White. Dairy cows are perhaps more apt to breed frequently than are beefy ones, and as some families are much more prolific than others, it will pay the breeder to keep track of this characteristic in not only animals of his own breeding, but also in those which he may purchase for breeding purposes. In the London Live Stock Journal of 1892 (Aug. 12)

a number of interesting examples were given of cows that had given birth to many calves. The Aberdeen Angus cow, "Mina 3rd," at 18 years of age, had produced 16 calves. John Rogers of Sawnington, England, gives a case of a Fed Poll cow dropping 12 calves in 11½ years, she having her first at two years, five months, and dropping twins twice. "The Short-horn cow 'Lady Oxford Kirklevington,'" writes Evan Baillie, "only just turned 12 years of age, has had 11 calves, all singles, and is two months gone with her 12th. Her dam 'Kirklevington 8th' had five daughters in succession and has handed down such a tendency to female produce that her youngest great great granddaughter is the forty-seventh." William Tudge, the famous breeder of Herefords, at Ludlow, England, gives the case of "Belladonna," in his father's herd producing 16 calves in 12 years, twins being dropped four times, while one of her daughters "Bracelet" in his own herd, dropped eight calves in five years, dropping twins three times, once on Jan. 7, 1890, and again on Dec. 31 of the same year. While this characteristic of producing many young may possibly go to an extreme in cases, it is more likely to be a lacking rather than a present quality. In any case it is not desirable that a dam should suckle more offspring than she can care for properly, whether lambs, pigs or calves. It however, is easier to kill off one or more weakly pigs of a good sized litter, than it is to increase the number in the small litter. And it is better to have a sire from such an inheritance, than from the more common sort.

As one travels about the United States, and becomes acquainted with our flocks and herds, he must of necessity, if observing, note the wide difference in the quality of the animals. But few of our breeders have a fixed type, and our herds present a mixture more often than not of widely different blood. Our stock yards show a vast number of inferior animals. Far too many of our breeders try a male of one breed for awhile, and then change to some other breed. They think they are experimenting, but they are not familiar with much that they should know, and as a result their work is not conducted with intelligence. How many breeders, think you, are there in a

thousand, who before crossing breeds, or using new blood, investigate and study two most important things, first—the general characteristics and adaptability of the breed to be introduced, and second—the principles involved in cross breeding? Yet, where so much is involved, should not this be done?

One of the interesting features of a trip to England or Scotland, is the live stock to be seen on every hand. What one sees is in great contrast to our American conditions. There the farmer pursues a method that has a fixed character. For many years the English and Scotch have carefully studied the local live stock condition, and this long ago resulted in the development of numerous fixed breeds over there, each seemingly suited to certain localities. While it is true that some of these breeds are more distributed than others, there are other breeds quite restricted in environment. In Ayrshire, Scotland, one sees only Ayrshire cattle, in Galloway the breed of this name occupies all attention. In Herefordshire, England, the Hereford has long held its own as the only kind of cattle kept by the farmers. In Shropshire, the sheep of this name is pre-eminent, while in the Cheviot hills, Cheviot sheep cover the face of the earth. The British farmer has pursued a conservative, systematic, well established policy, and this refers to registered as well as unregistered stock. There are many herds and flocks in Great Britain that are pure to all intents and purposes, yet unregistered. The animals are kept up to this high standard, simply because the British stockman has been taught well the lesson of the value of blood and uniformity of breeding. Here on the other hand, our American breeders use a free lance, and consequently one can hardly go to any section of the country and find large amounts of high class animals, such as are in demand in the meat or breeding markets. Here and there are pure bred herds and flocks that have a priceless value to our general stock interests, for to these must we turn if we are to give any standing to the character of American breeders and feeders. And so a proper debt of gratitude will never be paid to such men as Dunham, Holloway, the Robbins', Harris, Clark, Van Natta, Sotham,

Riley, Barker, Lovejoy, Allen, McKerrrow, Davison and a host of other great and true breeders, for the good they have done American live stock interests.

If the stockmen of the United States would but follow out the British policy, in a measure, and would persistently breed one type, even though not absolutely pure, I am sure our live stock interests would be considerably promoted. But to cross dairy breeds with beef breeds, drafters with roadsters or mutton with fine wool breeds, only complicates things.

The practice of cross breeding is, excepting one generation, and that for the butcher, usually unsatisfactory. This policy seems to set free in succeeding generations weaknesses and undesirable qualities, that had apparently laid asleep in the well established breed, qualities that the improvers had in the pure breed fairly suppressed. Undoubtedly the nearest successful approach to crossing lies in the use of very high class males on grades of the same general type. In this way herds are bred up and improved, so that really fine herds are developed by discriminating breeders. At our fat stock shows provisions are made for showing two classes of fat steers, pure bred, and grades or cross bred, and while numerous pure bred, and high grades are shown, it is not often that steers from pure bred parents crossed are shown. Yet high grades and cross bred have won many a ribbon over the pure bred, tho' all such crosses are usually the result of mating animals of every harmonious qualities. When such crossing is done, the new blood for one generation seems to give added vigor and strength to the feeder. And so authorities on breeding are very generally agreed, that the value of crossing lies mainly in producing for the butcher. On the Cheviot hills of Scotland, a favorite type of sheep for the butcher has been produced from crossing Border Leicester rams on Cheviot ewes. For a century or more this cross has been conducted with as much uniformity as has been the pure breeding of the sheep on the hills. In fact, in the English and Scotch markets, the visiting stockmen knows at a glance the source of blood in the butcher stock before him. Experimental crossing over there has long since been discontinued except-

ing in a very small way. As I have already stated, there are circumstances where crossing is justifiable, but this should not be to produce breeding animals. We have enough of a selection of good breeds today to answer all reasonable requirements. To the man who proposes to cross, I suggest to improve and secure what you wish by the process of selection. The man with a dairy herd can in time work wonderful changes in the capacity and character of his animals by constantly selecting towards the end he has in view. He can increase or decrease size, increase milk flow and also improve the quality of his milk. In any case, however, the process of improvement is slow and requires constant, intelligent study. Our improved breeds of today are the result of two great processes, that of crossing and selection. The former practise is now no longer necessary, while the latter so far as our American conditions are concerned, is most essential to our success as breeders. In fact it always must be so.

Another practise, that has been extensively tried in the past, is that of inbreeding, mating near relations as sire and offspring, etc. The history of the greatest breeders the world has ever known, has shown it to be an undesirable practice, resulting in lack of constitution, infertility and weakness. Bakewell, Booth, the Collings, and even Cruickshank in a measure, resorted to it and inbreeding with the hope that it would produce the ideal animals they desired. Yet in every case they found it necessary to introduce fresh blood into their herds in order to save them from ruin. The close inbreeding practiced by Thomas Bates, resulted in placing a stain on the name of Bates cattle, that it has taken generations to overcome, not withstanding Bates was perhaps the most wonderful breeder of the 19th century. We must have fresh blood in our herds, otherwise there will result deterioration, lack of stamina, size and general quality.

If one wishes to breed within certain family lines, then it is wiser to practice line breeding, keeping as far from inbreeding as possible, and yet using the blood relationship of animals within the same general family. There are St. Lambert Jerseys for example, and if one wishes,

he can breed along a line as indicated by this. One, however, cannot be much in error, if he seeks to secure the very best blood of the breed or type, preferably well removed from the stock to which it is to be mated.

In connection with this whole subject of breeding, every stockman should make a study of animal form and its relation to production. What is the most perfect form to be sought for in this or that animal? If one breeds dairy cows, does he understand what to look for in body form, in character and position of hind legs, in type of udder, in size and shape of milk veins and other details which have to do with the development these? If not, then he cannot develop his herd intelligently, until he has learned some of the lessons associated with this stock. If he does, then by application of his knowledge he should develop a valuable and beautiful herd.

I wish to make a special plea in behalf of the use of superior sires. It is in the highest degree unfortunate that so many inferior males are today used on our American flocks and herds. This is a well acknowledged fact, so much so that some years ago the Holstein-Friesian Association of North America paid a bonus for a year or more for all pure bred male calves that were steered. This was an effort made by the Holstein breeders to improve the average character of the sires to be used. Occasionally one sees a contribution in some live stock paper, urging greater discrimination in buying sires, but on the whole the matter receives little attention. Men who breed pure bred stock do not use the knife freely enough among their surplus males, and so many poor individuals really get out for service on herds owned by the less particular ones. One of the most disappointing admissions ever made to me by a famous stockman, came from a man of my acquaintance known the length and breadth of the land as a breeder of swine. Once I remarked to him, "Mr. Blank, do you ever sell any pigs to the butcher that you do not think satisfactory for breeding stock?" to which he replied, "No, I never do!" This man's ability as a breeder was great, but I do feel satisfied that he did produce at least some animals

that ought never to have been used for breeding purposes. I consider it a reflection on the greatness of this man as a breeder that he should have made this admission.

If it is important that the breeder should be particular about the class of stock that he breeds and sells, then he should also be very particular about the sort that he purchases. While but few can expect to buy great show animals, one can have a standard below which he should not go in securing additions to the herd. He should seek animals that are strong where his are weak, and should gradually round up his herd into one of uniform high class. The male with strong constitution will be likely to transmit the thick strong chest development desirable in all farm stock, and if his back be true and strong, with well sprung ribs, even offspring from females with backs of weakly character, will be likely to inherit the sire's strength where it is wanted. The man who wishes to perpetuate the fine things in animal character, does not look for the inferior, but the superior individual for a breeder. If he wishes speed, then he mates his mares to a stallion rightly descended in speed lines. If he seeks for milk, then he considers the ancestry in the way of milk production. Individual merit should always be the first consideration, but ancestry or pedigree should be a close second. It is true that blood will tell, and that animal that lacks in richness of pedigree, in a large number of cases may be considered of inferior merit. Too much emphasis cannot be laid on this matter, even with the man who breeds grade stock. So long as all the qualities possessed by animals are inherited, and just so long as these are transmitted to future generations to a more or less degree, just so long should breeders take heed to their work and strive to build up rather than down. And so when one visits farmers and sees them using inferior or commonplace breeding males, only a sensation of disappointment and regret can but reasonably expect to follow. Too many men wish to settle the purchasing question by a certain financial standard, rather than that of first finding the individual suited to their needs and then talking cost afterwards. Too many men desire to buy stock at hardly above butchers'

prices, and express no willingness to pay a premium to the man who is offering them animals that have been produced at great cost and effort. We all need educating, but such men need it a little more than the others.

One thing it will always be safe to recommend, and that is if at all possible, purchase no stock until you have first personally inspected it. It is an unsafe thing to rely on someone else to select that for you which is to be used to develop and improve your stock. We differ in our judgment, and each man should as much as possible rely on his own rather than on another's judgment in buying stock. Do not buy animals because they are cheap. Buy because you need them and they will do you good. Pay for quality rather than quantity. Get a good thing rather than a poor one, and do not find fault if you get a poor animal when you have paid the price for that kind.

In concluding this subject, I would not in any sense under estimate the importance of the subject of feeds and feeding. You will agree with me that we should feed only those that will yield a suitable reward in profit, yet how are we to secure this reward, unless we first breed the animals to eat the feed? So if we are to breed them, then they should be bred right, or not at all. And if we are to purchase the results of some one else's labor, then we should be wise enough in our own conceit to select feeders that have been bred right. There is no doubt in my own mind, that there are many men this winter who are studying the economy of feeds, who have no idea whether the animals they are feeding are paying for their keep or not. And so while it is agreed that the subject of feed is a very important one, the matter of breeding is the foundation on which successful feeding must rest. This is my reason at this time for making this plea in behalf of better practices in breeding our farm animals.

Discussion.

A Member: I would like to ask if Professor Plumb has noticed in the breeding of animals any effect of the first pregnancy upon the subsequent issue in regard to change of characteristics? I ask this especially in view of a little experience I had some time ago with some Southdowns. I

found that there set close upon the skin a very fine wool almost like the Merinos. I looked at the skin itself and it had the Merino type of skin instead of the ordinary hide of the Southdowns. I looked at these animals and looked at the pedigree. There was no question of the pedigree, but at the same time I took one or two others and we looked and came to the conclusion that there had been some influence at work in that flock and that that influence had been brought to bear upon the subsequent pregnancies by the sire or the first impregnation.

Professor Plumb: In other words, want to know if the first sire produces any impression on the female that will be felt, no matter what subsequent sires there may be. About fifteen or twenty years ago the theory was accepted that the first sire would have an influence felt during the succeeding life of the female. A great deal has been written in support of this theory; notably in the breeding of one animal with a quagga and afterwards with a thoroughbred the

the subsequent offspring had the peculiar marking of the quagga. That impression stood for a long time, but within the last few years Professor Ewart of the University of Edinburg has been conducting some of the most celebrated investigations yet brought forth. He took a zebra which was the nearest thing to a quagga and bred it for the first time to a Shetland pony. He also conducted some experiments with the horse, with guinea pigs and with other animals. While the most expert work in this direction has been going on for years it has been impossible to obtain evidence showing that the first impression leaves any subsequent influence.

Mr. Powell: With the ordinary domestic animal I question whether there is any influence whatever. We have very marked illustrations. Alice Carneal, the dam of Lexington, previous to producing Lexington produced a mule. Sweepstakes, the dam of Star Pointer, also had produced a mule. The influence, therefore, in these instances was not very detrimental.

Beef Making

By Prof. Thos. H. Mairs,
of Penn'a State College.

Although it is true that conditions in no two states are exactly alike, nor are the conditions exactly alike in different parts of any one state, yet there is no reason why beef production in Pennsylvania should differ radically from beef production in Illinois or in Missouri. Of course, it is known that there are other products of agriculture which in this State have been found by many of the farmers to be more profitable. This partly on account of the higher price of the land, and partly on account of the proximity to regular and almost unlimited markets. The soil, to be sure, of this State in many parts is greatly different from that of what might be called the beef producing states, yet there is no part of this State, as far as I know, which does not produce in abundance those crops which are necessary for the production of beef. The

crops which I have reference to are principally Indian corn, clover and blue grass.

As you know, Indian corn must for a long time yet furnish the basis of our fattening rations in most parts of the country. In the South cotton seed products to a great extent take place of corn in beef production, but the amount of beef fed thus far on cottonseed, meal, hulls, etc., is very small in comparison with that fed on corn.

In recent years, most of the cattle fed for beef in this State have been from the west, yet is it not possible and desirable that many more of these be raised at home? It may be argued that the land of Pennsylvania is too valuable for pasture purposes, and that beef production cannot successfully be carried on without pasture. Nevertheless, it is well known

that in Great Britain, the home of the beef breeds, land is a great deal more valuable than in this State; but there the farmers pay the same attention to their pastures that they do to their other fields. They study the production of their grazing crops as well as the production of the crops which they harvest. Their pastures are regularly fertilized and cultivated and re-seeded and given whatever attention is necessary to promote the largest yield of grass. Too often in this country land is cultivated in grain and other crops until it will not make a profitable yield, and is then turned into pasture. The pasture is the most neglected part of the farm and is supposed to be able to take care of itself. All of the more prominent breeders of pure bred stock in this country make large use of pasture. In many parts of this State there is land going absolutely to waste, which might be profitably used for grazing purposes. There is a large amount of land in the State which is too rough for cultivation, but which will make good pasture. Most of this land was at one time heavily timbered, but the timber has been removed and fires are now allowed to run through it from year to year, so that it cannot be re-forested. It is growing up annually to plants which are of no value whatever.

In times past the centre of the beef producing industry has moved toward the west. The large tracts of public domain formed excellent pasture and were to be had for occupying. At present however, all this is changing and the centre of beef production must sooner or later come eastward. These large tracts are being taken up by actual settlers, and land is becoming too valuable to be allowed to lie idle. The United States Government in behalf of the settlers is tearing down the fences which have been built on the public land by large cattle owners of the plains. Many of the large ranches not on public land are already being divided up into farms and smaller holdings, as the Capital Syndicate or X. I. T. ranch of the Pan Handle, of Texas, and many others, less extensive, have been done. It is becoming more and more expensive every year to produce cattle in the west. Pennsylvania feeders must each year rely still more upon home grown animals for

beef making. This being true, it is to their interests to look to that class of animals and those kinds of feed which will produce beef most economically.

In order that the breeder may obtain the best price for his product, it is necessary that he feed animals of the type that is demanded by the market. At present, the market demands an animal with a broad back, and large development of the hind quarters. When an animal is bought, it makes a great deal of difference whether the last few pounds of his weight is composed of sirloin or porter house which will sell from 20 to 22 cents per pound, or composed of soup bones that will sell from 3 to 5 cents per pound. The average farmer often seems to think that a cow is a cow, and that it is a mere accident whether she is a good milker or will produce calves that are good beef animals. It is impossible to produce beef profitably from mongrel stock. It is not that they will not make good gains, nor that they will not make good use of the food consumed. It is because the form is not such as to sell for the best price in the market. Tests which have thus far been made show that the ordinary scrub steer will make a pound of gain on as small an amount of grain as will the average Shorthorn, or Angus, but when each has made this gain, the scrub will sell for one or two cents per pound less than will one of the beef type. The reason for this is that the animal of the beef type has his flesh in those parts from which are taken the higher priced cuts. The fat of the scrub or dairy type of steer is large intestinal, while that of the beef type is more evenly distributed throughout the muscular system. His muscular system is also more fleshy on his back, where the porter house, sirloin and prime of ribs cuts are found.

According to a diagram and scale of weights arranged a short time ago by Swift & Co., for Professor Mumford, of Missouri, a good 1200 pound beef steer will net about 708 pounds. At the present retail price for beef, 346 pounds including the porter house, sirloin, prime of ribs, rump and round would be worth \$50.58, and 362 pounds including the neck, chuck, rib plate, flank, shin and shank would be worth \$18.75, making \$69.15 for the dressed carcass. It is seen that the back and

hind quarters, while they form less than one-half the weight of the steer, still represent about three-fourths of the value of the whole carcass. The other parts are composed of low price cuts. Thus you see if the weight of the animal is mostly in the fore quarters, or lower parts of the body, the butcher cannot realize from him nearly so much as if his weight were situated where the high-priced cuts are found, and consequently will not pay as high a price.

If in any locality it seems desirable to produce beef alone, the breeder will turn to those breeds which produce beef with the least expenditure of energy in other directions; if it is desirable to produce milk primarily with beef as a side issue he will turn to such breeds as the Short Horns, the Galloways, the Red Polls, the Devon, or Brown Swiss. Where, of course, beef is of little consideration, the pure dairy breeds, like the Channel breeds, and the Holsteins, will be the ones raised.

It is frequently argued that it is impossible for animals of the beef type to produce milk economically, but the records of certain Short Horns and Red Polls are against such argument.

If an animal is of the proper form for beef making, the thing for the feeder to consider is the kind of feed which will be used most economically by that animal. As has been stated, American feeders must for the most part depend upon corn for the basis of their fattening rations. Corn alone, however, as is well known, does not form an economic feed. The animal needs something to furnish nitrogenous matter in larger amounts than it is possible to obtain it from corn in the quantities that may be digested under ordinary conditions. Oil meal, cotton seed meal and bran have been recommended to use in balancing the corn ration. Feeders who have fed corn alone and corn with bran, linseed meal or cotton seed meal with timothy hay, or corn stover for roughness, are pretty generally agreed upon the superior gains made by animals who were fed the more nitrogenous grain along with corn. All of these feeds, however, are rather expensive. It is desirable then to find some cheap nitrogenous feeding stuff to use along with corn stover, or corn ensilage for growing or fattening animals.

During the winter of '99 and '00 a trial was conducted at the Missouri Experimental Station with four lots of steers, to study the effects of different kinds of roughness on their growth, when they were fed only a small amount of grain. Three of the lots got four pounds of corn per steer daily. One lot received no corn. One lot was fed clover hay and corn stover with corn; one lot was fed cow pea hay with corn; one was fed timothy hay with corn; the other lot cow pea hay without corn. The lot fed clover hay and corn stover and corn made a total gain of 356 pounds, or an average daily gain of .88 pounds. The lot fed timothy hay and corn made a total gain of 260 pounds, or an average daily gain of .64 pounds per steer. The lot which was fed cowpea hay and corn made a total gain of 624 pounds, an average daily gain of 1.54 pounds. The lot which was fed cowpea hay with no grain made a gain of 288 pounds, an average daily gain of .56 pounds.

Growing steers on corn and cowpea hay gained almost two and a half times as much per day as on corn and timothy hay. Steers on cowpea hay alone gained almost as much as on timothy hay with corn. The cowpeas were of a late maturing variety and were cut before they had produced any pods, so that their superior feeding value could not be attributed to the grain which they contained.

A second trial with five lots of steers was conducted the next year, beginning January 29th, ending April 19, lasting 80 days. These steers were fed 6 pounds of corn daily per steer. One lot was fed timothy hay for roughness, the second lot was fed clover hay, the third lot was fed millet hay, the fourth lot was fed sorghum hay and the fifth lot was fed clover hay and corn stover. The steers fed timothy hay gained 318 pounds, practically one pound each per day. The steers fed clover hay gained 640 pounds, or 2 pounds per day. The steers fed millet hay gained 119 pounds, or .37 pounds per day. The steers fed sorghum hay gained 166 pounds, an average daily gain of .52 pounds. The steers fed stover and clover gained 433 pounds or 1.35 pounds daily per steer.

The millet and the sorghum hay were included in the test, because a

great many farmers have been raising them as a sort of catch crop to furnish roughness during scarcity of other kinds of forage. The results of this trial were decidedly against both the millet and the sorghum hay. There is no special reason for growing millet and sorghum, as some of the varieties of cowpeas may be grown in as short a season as the millet or the sorghum. Cow peas have the advantage of adding fertility to the soil, while the millet and sorghum are both known to be very exhaustive. From the tests in supplementing corn stover with clover hay, it would appear that there is no great reason for feeding hay alone, when it may be supplemented by corn stover, and much larger gains be made than can be made with timothy hay, millet, or sorghum.

A thing which is often overlooked in wintering the animals is their future treatment. These animals were all turned the following summer upon mixed pasture, consisting for the most part of blue grass, red clover, timothy, white clover and orchard grass in about the order named. In general the animals which made the smallest gain during the winter made the largest gain the following summer. It would appear then that if these large gains were made at an increased expense or outlay of money, they might not be profitable, unless the feeding was kept up. If after being brought through the winter, animals are to be put on full feed to fatten during the summer, considerably more expense may be incurred in wintering them than if they are to be carried over. While the animals which made the poor gain during the winter made the best gains during the summer, they were never able entirely to overtake the ones which had got a good start during the winter. As these animals were all turned into the pasture in the spring, it is impossible to give any data concerning the amount of grass eaten by the different lots. The ones fed on the leguminous hays were much more nearly fat than the others, so that it would require much less feed and time to fit them for the market. These larger gains were made at actually less expense than the smaller ones, since amounts of clover and cowpea hay eaten were practically the same as that of the timothy hay and the

timothy hay sells in the market for \$1.00 or more per ton more than the others.

These animals were young and the gains made by them were chiefly growth and not fat. The food was used in building up muscle and other vital tissues, instead of laying up a reserve store of surplus material. It might be expected therefore that they would make much better gains on the nitrogenous fodders. It has been argued, however, that fattening animals have little use for nitrogenous food, and further that if it is fed it must be fed in the grains or concentrated portion of the ration. That the kind of roughness is immaterial and it serves only to distend the stomach and to aid digestion; that it is not itself digested; that all gain that is made comes from the grain. To test the soundness of these arguments, some tests were made with fattening steers.

Two lots of four steers each were put on feed December 16, '99 and fed until April 14, 1900, or 119 days. Each lot was given all the shelled corn it could eat, and the conditions were made as nearly the same as it was possible to make them, except for the kind of roughness fed. One lot was fed corn with timothy hay for roughness, the other was fed corn with cowpea hay for roughness. The two lots ate practically the same amount of roughness. The lot which was fed corn and timothy hay made a total gain of 802 pounds; the lot fed cowpea hay made a total gain of 1257 pounds. When timothy hay was used for roughness, it required 11.51 pounds of corn to make a pound of gain, and when cowpea hay was used, it required only 8.31 pounds of corn to make a pound of gain.

Realizing that a single test of this kind was not to be too much depended upon, a second trial was conducted the next year, beginning January 6, 1901, and ending April 16, 1901, 105 days. For roughness, the first lot was fed timothy hay; the second lot clover hay; the third lot cowpea hay; the fourth lot clover hay and corn fodder; and the fifth lot clover hay and wheat straw. The lot which was fed on timothy hay made a total gain of 789 pounds; the lot which was fed on clover hay made a total gain of 1135 pounds; the lot which was fed cowpea hay made a total gain of 1134

pounds; the lot which was fed clover and corn fodder made a gain of 1140 pounds; the lot which was fed clover and wheat straw made a total gain of 1073 pounds. In every case where the leguminous hay is fed, the steers ate larger amounts of corn than they did where timothy was fed but they also made larger gains. The steers fed on timothy hay required 11.19 pounds of corn for a pound of gain; those fed on clover hay required 8.69 pounds of corn for a pound of gain; those fed on cowpea hay required 8.65 pounds of corn for a pound of gain; those fed on clover and corn fodder required 8.31 pounds of corn for a pound of gain, and those fed on clover and wheat straw required 9.21 pounds of corn for a pound of gain.

None of these gains are very remarkable, but they show at once the advantage of feeding nitrogenous roughness. Besides the advantage of producing more economic gains, there is another one in the more valuable manure produced. At the present price of nitrogen, phosphoric acid and potash, a ton of clover hay contains about \$9.13 worth of fertilizing ingredients, a ton of cowpea about \$8.13 worth, while a ton of timothy hay contains only about \$5.36 worth and a ton of corn stover about \$4.96 worth. Since 80 to 90 percent of the fertilizing ingredients were returned in the manure, the second advantage of the leguminous fodders is readily seen.

Cow peas have some advantage over clover. There is no difficulty in securing a stand; they make their growth in a shorter period of time and so may be used as a catch crop, besides the hay produced by them is not injured by rains to near the extent that clover hay is. Cowpea may be grown in as short a season as millet or sorghum and produces practically as large a yield. At the Pennsylvania State College last year, Early Amber sorghum produced 4337 pounds of dry matter per acre and Whip-poor-will cowpeas 4071 pounds or a little over two and a quarter tons of hay. The peas were sown May 28, and harvested about September 5.

The profits of beef production, as of any other production will depend largely upon the cost of the material used. A ration of timothy hay and bran, or oil meal having the same composition as clover or cowpea hay would under nearly all conditions cost

decidedly more than the clover or cowpea hay. Clover and cowpea may in most cases be grown more cheaply than timothy, even without taking into consideration their benefit to the soil. If a stock grower can obtain the same results from the use of clover or cowpea hay that he can from the use of timothy hay with wheat bran or oil meal, he has increased his profits the difference in the cost of the two rations.

Discussion.

Mr. Gamble: I would like to ask how many bushels of cow pea is sown to the acre, and how deep it is drilled in?

Prof. Mairs: We sow a bushel and a half to two bushels to the acre, of Whip-poor-wills. Of New Eras, we sow less because the seed is small. We put them in two or three inches deep.

Mr. Palmer: Have you any trouble with their falling down and growing as bush beans?

Professor Mairs: We did have some varieties of the cow pea that fell down and became matted when in drills thirty inches apart; but when they were put in with a wheat drill there was no difficulty at all.

Mr. Palmer: Do you not get more seed from the soy bean than from the cow pea?

Professor Mairs: Possibly you will get more seed from the soy bean than from cow pea. There is this difficulty with the soy bean; as soon as the bean gets ripe, in many cases the pods will drop off. This has been my experience about half the time.

Dr. Conard: You speak of sowing the cow pea late in May and harvesting it the first of September; could it not be sown earlier so there could be a longer time for harvesting?

Professor Mairs: Yes, you could sow the cow pea earlier, but it needs more warm weather for growing.

Dr. Conard: At about what state of growth do advise cutting the cow pea?

Professor Mairs: The time of cutting depends upon the variety of the seed. It ought not to be cut until September. It is cut with a mowing machine.

If it is a variety that matures seed, it should be cut about the time pods first turn yellow. If it does not mature

seed, cut when the lower leaves begin to drop off. If there is danger of frost, cut earlier.

Mr. Lantz: I would like to know whether the cow pea can be cured for hay. In our section of the State many would have sown cow pea if it could have been safely cured.

Professor Mairs: That is a question which has come up before. We have tried a good many methods of curing them. We have cured them in shock which is most desirable, let them wilt, put them up in bunches and put covers over them, and have left them out for two weeks. Another method is to put a layer of straw, and a layer of peas or else a layer of rails and peas. We have cured them very satisfactorily in that manner. I have had no experience with curing them in the barn.

Mr. Martin: Have you had any experience in planting cow peas in alternate rows of corn?

Professor Mairs: I have had experience in planting cow peas in corn about the time the corn is laid by, but my experience has been unsatisfactory. Other people whom I know claim success. They also plant the cow peas with corn and put the whole thing into the silo.

Professor Plumb: I would like to ask if you have found the cow peas palatable to the stock, particularly to the cattle? I have had difficulty in having the stock eat this in silo. I have turned hogs in on the cow pea, and they would not touch it. The taste seemed to be unsatisfactory. I have had some correspondence with experimental stations and there has been some surprise at my experience.

Professor Mairs: The green pea vine is not eaten at first by the average cow or horse, but I have had no difficulty so far in getting the hay eaten. The animals fed this hay ate it up absolutely clean, and would eat the stalk that had been out in the rain. As far as the pigs were concerned, I know we had considerable difficulty in keeping them from breaking in where the pea was being fed to other stock.

Professor Plumb: In my experience there are two classes of cattle that will eat the cow pea; those used to scanty rations, and those with ordinary fare. High fed cattle will not eat it.

Mr. Barber: I have had practical-

ly the same experience as others with the cow pea, but last year I planted more than ever before. The cattle do not like it green. I never did much with horses, but have found by experience that whether you feed them well or not they become very fond of cow pea and will take it green after a little bit of education.

Mr. Cloud: I have had some half dozen different kinds of cow pea in a small way, and probably about the middle of July I would plant two rows across the truck patch. I found that the cows eat everything, even the roots. I have had one or two dairy-men tell me that when they run short of pasture they have had good results by putting the cows on the cow pea. I would be afraid to undertake to make hay of the cow peas that I grow; many of the stalks are as thick as my finger; but there is no trouble about the stock eating it.

Mr. Smith: In the South the cow pea is very popular, and I have come into contact with a great many farmers who praise it as a plant and as hay. There seems to be no definite answer to the question how to cure it. Pardon me if I make a few suggestions. The plant in its early stage is very sappy and you find the stock do not like it, but at a later stage when the pod is pretty well filled, then the oxen, cows, and horses eat it. In curing our process is to cut with sythe if the crop is very rank. Place the scythe around so that it will cut the swaths apart so that they can be handled better. After the vine is wilted we pile it up and leave it until it heats. We next open the stack, and that evening before dew falls we cock them up again. The next morning we proceed the same way and haul them in that day. Put them in the mow. The sap will cause them to get hot, and the moisture will pass away and they make a rich food.

I have learned from Professor Massey of the South Carolina Station that there is a large amount of nitrogen in the vine which causes the cows to be so fond of it.

Professor Mairs: I would like the opinion of this audience in regard to alfalfa, and to know how many are growing it largely.

Mr. McSparran: I have been impressed with the results of my raising alfalfa. Last Spring a year I prepared a fine piece of ground with

extraordinary care and sowed alfalfa. It came up reasonably well and I started a mowing machine around it according to instructions and succeeded in cutting down weeds and alfalfa with the result that the low down plantain had destroyed all the alfalfa. Last spring I again sowed alfalfa and have a fairly good stand, about 6 in. I think it will make a crop for at least the winter.

Mr. Martin: I planted an acre of alfalfa two years ago in the month of June. It immediately grew, covered the ground thoroughly, and in ten weeks after planting I mowed it all. It was a foot high or more. The

ground was raked over carefully. The crop was mown three times, the last time in October. I took no account of the weight of the crops. Last season my experience with the crop was not just so successful. The weeds got mixed in and caused some discouragement. However, when the snow began to fall, the alfalfa had grown after mowing four inches high. The subsoil is an open gravel, and the alfalfa roots had reached down four feet into this soil. I am free to say that, given proper location with an open subsoil, free from standing water, alfalfa can be successfully grown in Pennsylvania.

The Value of a Pedigree.

By Prof. Geo. C. Watson,

of Penn'a State College.

The term "pedigree" is generally accepted as meaning a written description of lineage or ancestry. The endeavor to trace lineage or relationship to some noted individual undoubtedly led to the development and complete record of lineage of many of our domesticated animals, which extend through many generations of time.

Without doubt the ancients placed considerable value on the lineage of their animals. It is known that they considered some animals far superior to others for the purpose for which they were at that time used. It is also known that one of the earliest recognized principles of stock-breeding, "Like begets like," helped, perhaps, more than did any other principle to give to pedigree the importance which has been accorded to it.

As the animals which formed a considerable part of the possessions of man become more valuable through the advancement of civilization, more dependence was placed upon the usefulness of these servants of man. It is only natural to suppose that the continual increasing value of domesticated animals fostered a continual increasing desire on the part of the owners to trace the lineage of their animals to individuals of recognized merit. It was the descendants of not-

ed animals that first claimed the benefit of any guarantee of value, written or legendary, which pedigree afforded.

As the pedigrees were first written of animals which descended from noted stock, the idea of superiority was at an early time associated with written lineage. This idea of superiority has not been wholly confined to the lineage of domestic animals. Many families of the human race set themselves up on more or less lofty pinnacles, and hold themselves somewhat aloof from other families or tribes because of their superior lineage. To the minds of many, this implies that at some time the original stock from which they descended was supposed to have been "made out of a little better clay" than the common stock from which ordinary mortals have descended. Without doubt the so-called "Divine right of kings" has, in some measure, been the outgrowth of the superiority guaranteed by that which we now recognize as pedigree.

For the convenience of study and discussion, that which is implied in the popular word "pedigree," may be considered under two quite distinct and somewhat widely-separated divisions, as:

1. A means of tracing lineage only.
2. A guarantee of superiority.

The published records of lienage as now preserved by the various associations, which have for their subject the advancement of the interests of various breeds of live stock, afford a more or less accurate and reliable means of tracing the lineage of recorded animals through many ancestral generations. It is a matter of somewhat common information that some associations guard the integrity of published statements, regarding lineage, much more closely than do other associations. Consequently the published statements of some associations carry a much more worthy guarantee than do those that are not so carefully guarded. As all men are not equally honest, laxity on the part of the associations has afforded the unscrupulous an opportunity to defraud his co-worker or co-breeder of his legal and just rewards. As some pedigrees are known to be faulty and unreliable, the reflection on others that are trustworthy becomes more or less serious.

With pedigrees as with individuals in society, the kind of company that is kept affords a measure of value as to standard and conduct. As the usefulness of many recorded pedigrees has become somewhat impaired through the association with fraudulent ones, it is for the honest, straightforward and progressive breeders to unite and to adopt sufficiently stringent rules and regulations for registrations that will reduce fraud and imposition to the minimum. In order that the recorded lineage of domestic animals may become of the greatest service to the live-stock breeders of the country, the integrity of the statements made must be most carefully guarded. If a reasonable doubt exists as to the correctness of some, the value of all records is more or less impaired.

As a guarantee of superiority, the published pedigrees of animals of various pure-breeds occupy decidedly uncertain positions. In the minds of many inexperienced breeders, an assurance that an animal is eligible to registry or has been recorded is accepted as a guarantee of superiority. Without doubt many farmers purchase registered stock feeling that the registration certificate, to some degree at least, guarantees to them a superior animal or animals as the case may be.

Registered animals frequently fall into the hands of unskilled breeders, who permit the improvement which the breed may once have possessed to deteriorate until the registered animals for purposes of utility are no better than the common stock of the country that lays no claim to superior lineage. This degenerated stock is credited with registration numbers, and produces progeny that show perhaps still further deterioration, although they may be recorded side by side with the best animals that are known to that particular breed.

Deterioration may go on from generation to generation as the registration numbers increase. The unskilled breeder, who is unfamiliar with the story which the pedigree is supposed to tell, finds through a disappointing experience that he has little guarantee in the registration certificate. Many farmers and breeders seem to forget that the improvement, which has been produced in so many breeds of pure-bred stock, was obtained at great cost through years of patient toil in maintaining what we now recognize as the foundation-stock, under the most congenial conditions. As improvement was made through congenial conditions as regards food, shelter, care, etc., the improvement will become less with each succeeding generation, if the congenial conditions are supplanted by improper food, exposure and neglect. It is a matter of somewhat common observation to find registered animals maintained on many farms in a condition that will bring discredit, not only to the improved breeds of stock, but to well-kept, common stock of the country.

Under the existing conditions, is it not evident that one of two courses must be adopted if the value of registration is not to be permitted to further deteriorate? Either the conditions under which many registered animals are maintained must be improved, in order that the value of these machines for useful purposes may not diminish, or a separation of the worthy from the unworthy must be accomplished.

For generations much stress has been laid upon pedigree, and comparatively little has been heard of the necessity of providing better food for the improved classes of live stock. Very many farmers purchase animals of improved breeds thinking that if

the improvement is good for anything that it will prove beneficial to them if they maintain the improved animals under the same condition which their common stock has been maintained for generations.

When a meritorious, well-cared-for individual of an improved breed is suddenly transferred from congenial surroundings, provided by the hand of a successful breeder and feeder, to the uncongenial surroundings, marked by neglect and deprivation, a decline is at once inaugurated. The animal in question may have what we call "sufficient vital force" to carry it along for a few years with greater profit to the owner than is produced by other animals that have been maintained during their whole lives under similar, uncongenial conditions.

At first the farmer, who has just purchased, is highly pleased with the change, and praises the advantages of pure-bred stock. But later, as his stock deteriorates, his enthusiasm wanes.

To still further illustrate, many conditions which are found in Pennsylvania and other States, we will suppose that the animal just mentioned was a highly-prized cow. She has a calf which is highly prized by the owner, and is given somewhat better food than he is accustomed to give his unimproved stock, although the care and food given to the calf falls far short of that which was given to the cow while she was a calf. Consequently the calf of this cow does not develop and become an equal to her mother. In turn this heifer-calf is bred, perhaps, to a registered animal of the neighborhood that is no longer worthy to be called a representative of an improved breed. The resulting calf is not so highly prized as were those of previous generations, and consequently is not so well cared for. This method of breeding and feeding is repeated with successive generations until the level or plane is reached which the food and care that is provided, will maintain. As the spring will not rise higher than its source, neither will an insufficient amount of skim milk and poor pasture in "fly" time, followed by uncongenial conditions of winter feeding, develop the most economical milk producing machine. But these negligent breeders state that their animals are hardy and are endowed with a

strong constitution, and further say that it is freely asserted by eminent authorities that "a certain amount of exposure is conducive to hardihood, and to the development of a strong constitution." They point to the many illustrations in nature to support this assertion, and even include tribes and races of men that are subjected to various degrees of exposure and hardship. Those that are most protected from the rigors of winter, and lead lives of ease and luxury, are not noted for their powers and physical endurance, nor for their longevity. Without doubt a certain amount of exposure tends to develop a strong constitution, which will enable the individual to withstand hardships and privations that might bring disastrous results to a weaker constitution. Strength of constitution in domestic animals is of great importance, but extreme development is undesirable. It is important that our improved breeds of domestic animals be strong and vigorous. The modern tendency is toward extreme production along useful lines, although the life of the machine may be shortened thereby. In order that the extremes of usefulness may be reached, it is necessary that the animals be endowed with strength and constitution, which will enable them to withstand severe and hard work along the useful lines for which they have been developed and for which they are maintained.

The many tests of production, with dairy animals especially, have shown clearly that the weak-constitution animals succumb first. Those that are not able to withstand the terrific strain which the feeders impose upon them, succumb to one or more of the various forms of weakness, which do not adversely affect animals of stronger constitutions, although they may be subjected to precisely the same treatment.

While strength of constitution is of great importance in our domestic animals which are subjected to greater hardships and privations with many species of wild animals the strength of constitution is an all-important consideration. These animals have been bred for hundreds of generations in a manner which is intended to develop the strongest constitutions. Almost without exception those wild animals, which are the strongest and most vigorous, leave the largest number of

progeny. Of these, the most vigorous again in turn become the most prolific breeders. This process of natural selection, which has been styled "the survival of the fittest," is of comparatively much more importance with the wild animals than with the improved breeds of domesticated stock. Stock breeders have sometimes applied the term "survival of the fittest" to improved animals, meaning that to those animals which are best suited for purposes of utility should fall the lot of continuing the breed or propagating the species.

The cow having the most vigorous and robust constitution of any in the herd is not likely to be the greatest producer, neither is she so likely to remain in the herd as a breeder for the longest time. As long as animals are well cared for the extreme strength of constitution is not so desirable as the extreme development of useful qualities. There seems to be a somewhat general law in nature that prevents the extreme development of useful qualities along two or more quite widely-separated lines. If the energies of the individual are turned toward the development or production of useful products, this desirable quality is reached at the expense of some other quality that may be all-important under different conditions. Consequently the extreme production of useful products, and the extreme vigor of constitution, are not found in the same individual. The farmer who causes his live stock to be exposed to severe, climatic conditions, and fails to furnish a bountiful supply of nutritious food, develops a tendency in his animals towards production of strong constitution, which will enable his animals to withstand best the trials and deprivations to which they are subjected.

As this quality develops slowly, though it may be, from generation to generation, the useful quality for which the animals are maintained will correspondingly decline until a condition is reached which will be maintained without perceptible increase or decrease under the existing conditions. In other words, nature has accommodated herself to the existing conditions and an equilibrium has been restored. As nature endeavors to maintain what is frequently called an "equilibrium," man frequently endeavor-

ors to destroy it. He changes the conditions in order that certain features may be increased or diminished according to his wants or fancy. As these conditions are permitted to relapse toward the state of nature. The improvements which he effected must necessarily approach the natural conditions which existed before he disturbed nature's equilibrium.

The breeders of live stock have improved domesticated animals for their own use far in excess of that provided by nature. This improvement has been secured through more or less artificial conditions. As these artificial conditions are partially or wholly neglected, the improvement retrogrades. The usefulness of the improved breeds of horses, sheep, cattle, swine and poultry has been secured largely through the agency of improved, artificial conditions. Improved care, improved feeding, together with congenial surroundings have fostered and developed that which cannot be maintained if the care is withdrawn. Deprivation and hardship are antagonistic to the high development of useful qualities. The careless and indifferent breeder, or careless and indifferent feeder, permits the animals which he produces, through generations of breeding, to become less-economic machines for the purposes for which they are kept. As improved machines demand improved conditions, so do improved animals require improved and congenial surroundings for their maintenance.

The pioneer farmer who cleared his farm from the primitive forests, found it necessary to work with crude, rude and strong implements. They were heavy, cumbersome and inefficient from the standpoint of modern improvements. As the old-fashioned "A" drag, manufactured perhaps from the fork of a tree, has given way to the smoothing-harrow and the spring-tooth; so has the animals of early times, that were little removed from the state of nature, given place to more useful improved breeds of domesticated stock. Both the improved stock and the improved implements require to be used and maintained under superior conditions. Unless improvements are maintained, retrogression is inevitable.

Is it not true that hundreds and thousands of animals in this country have been maintained for generations

under unfavorable conditions, and that deterioration has resulted? While these animals have been recorded in published registries or herd-books, their usefulness has become so much impaired that for practical purposes many of them are no better than the common stock of the country, which makes no boast of breeding and to which registration is denied. Animals of improved breeds, which should be synonymous with pure-bred stock, should be superior for usefulness.

Registration should be a guarantee of useful qualities; but until some higher standards are required, the shiftless, negligent breeder will profit at the expense of the skilled and the trustworthy.

The statement is made in the first volume of the English Racing calendar that a creditable performer is well bred, it being taken for granted that a horse could not be a notable performer on the turf that was not well bred. This assumption is still held by horsemen, and is rarely if ever found at fault. While this assertion, sweeping as it may seem to be, acknowledges the capacity of well-bred animals for well doing, to be superior to that of animals of common or mixed breeding, it does not in any way guarantee the power of well doing for all registered stock. So the term "registered stock" may or may not assure superiority.

Improved stock, like improved mechanical appliances, is most economical under favorable conditions. If improved animals are maintained under adverse conditions for generations, they may become extremely dangerous as breeding-stock. These animals, if maintained for many generations until marked deterioration has resulted, will undoubtedly transmit their undesirable qualities to a greater certainty than will those of common or mixed breeding. This recognized fact has led to the enunciation of the somewhat well-known truism, that there is nothing so dangerous as a "scrub thoroughbred." The term "thoroughbred," in this connection, is undoubtedly used somewhat loosely to indicate pure-bred or registered stock.

Deteriorated pure-bred stock may become, for breeding purposes, the most dangerous of all stock.

It is the object of this paper to present some of the dangers which confront many inexperienced breeders,

and the pit-falls which have wrecked the high aspirations of amateurs and brought discredit on truly-representative and meritorious animals. As long as many farmers and amateur breeders are denied the opportunity of studying the pedigrees of animals in their true light and depend on the registration certificate for the guarantee of excellence, there is sure to be disappointment and failure in many quarters. Pedigrees should be studied for the story which they tell. They simply tell a story of the lineage, and in some cases, performances of ancestors. If a pedigree tells a good story, it should be accepted as a good pedigree. In order to be a good pedigree, there must occur the names of meritorious animals all along the line, more especially in the recent generations. A good pedigree gives some assurance of superiority. Until an unskilled breeder can have some assurance of superiority in pedigree, the greatest good and the highest development of improved stock will not be reached. When better feed and better care are enforced for a larger number of animals, the more rapid will be the development. The greater the number of animals that are maintained under the conditions that are worthy of improved stock, the greater will be the number of markedly superior animals that will be produced, and consequently the greater the advancement of the breeds which these animals represent. Until some creditable performance is required for registration, many inferior animals will be recorded side by side with the meritorious. As long as inferiority and superiority are given the same registration guarantee, comparatively few breeders are in position to read aright the story which has been recorded. Already some associations require certain performances for registration, recognizing the principle that an animal is good or poor according to its power to produce. Other associations will undoubtedly find it necessary to adopt some similar method of weeding out the undesirable and dangerous breeding stock, in order that a recorded pedigree may afford a greater guarantee of superiority. If the pedigrees published by an association can be accepted as a guarantee of superior merit, registered stock will receive recognition by the breeders throughout the country

that has been accorded it in the past. Is it not for the breeders of the present and future generations to require a higher standard of excellence for registration if the greatest good is to

be accomplished by the various associations which are now endeavoring to advance the interests of the various breeds which they represent?

Report of the Committee on Nominations.

Mr. W. G. Powell: The Committee is unanimous in the opinion that with a good man in a good place, it is best to keep him there, for a time, at least. In view of that we have made no changes in the officers, except to fill vacancies. Your Committee offers the following nominations:

President, W. C. NORTON,
Aldenville.

1st V. P. HENRY PALMER,
Avondale.

2d V. P., M. P. SHOEMAKER,
Greensburg.

Secretary, E. S. BAYARD,
East End, Pittsburg.

Treasurer, J. F. LANTZ,
Isabella.

Executive Committee.

W. G. POWELL,
Shadeland.

EDWARD WALTER,
West Chester.

D. NORMAN APP,
Selin's Grove.

WILLIAM BERRY,
Washington.

GEORGE C. WATSON,
State College.

H. A. FIELD,
Wellsboro.

The officers of the Association, ex-officio.

Committee on Fairs.

W. C. BLACK,
Mercer.

J. L. HENDERSON,
Washington.

W. F. HOLTZER,
Greensburg.

Legislative Committee.

H. W. COMFORT,
Fallsington.

DR. THOMAS TURNBULL,
Allegheny.

R. L. MUNCE,
Canonsburg.

W. F. CABLE,
Altoona.

WILLIAM R. WILLIAMS,
Philadelphia.

The President and Secretary, ex-officio.

Committee on Transportation.

DR. LEONARD PEARSON,
Philadelphia.

T. E. ORR,
Beaver.

DR. J. CHESTON MORRIS,
West Chester.

F. J. MCCAIN,
Mercer.

JOS. T. FLEMING,
Bellville.

It was moved and seconded, and unanimously carried that the gentlemen named by the Nominating Committee be elected for the year.

Hon. W. C. Norton: I thank you, gentlemen, for the honor.

Upon motion the following Resolutions were passed:

WHEREAS, the Governor and State Board of Live Stock Commissioners of Illinois, have established restrictions upon the movement of cattle from Pennsylvania to Illinois, on account of the foot and mouth dis-

ease in some of the New England States, have made quarantines and announcements that may readily create the impression that the cattle of this State are infected, and say explicitly, in an official document,

that the infection is extremely likely to spread to the "bordering and adjacent" State of Pennsylvania, and they have scheduled Pennsylvania with the infected New England States, and

WHEREAS, there is absolutely no valid ground for this action, since there is no foot and mouth disease in Pennsylvania nor in any bordering or adjacent State, and there is no more danger that the disease will occur here than in any other State now uninfected and,

WHEREAS, the unwarranted action of the authorities of Illinois is likely to create abroad the false impression that the foot and mouth disease infection is much more widely distributed than is in fact the case, and that the force and measures employed in suppressing it are not sufficient for the task, and that the territory adjacent to the ports still free for the export of cattle is in imminent danger of infection, thus seriously hampering or destroying American export trade in live animals, be it.

Resolved, That we, the Pennsylvania Live Stock Breeders' Association, and the State Dairy Union, in joint meeting assembled, severely condemn the action of the Governor and State Board of Live Stock Commissioners of Illinois who alone of all similar State authorities have by their hasty action without sufficient investigation created unnecessary alarm and distrust in respect to the foot and mouth disease situation. Furthermore, their acts might readily have led to an enormous if not an irreparable injury to the live stock interests of the United States, and that this did not result is, in our opinion, due largely to the immediate counter action taken by the State Live Stock Sanitary Board of Pennsylvania, be it further

Resolved, That we hereby recommend to the Governor and Board of Live Stock Commissioners of Illinois that they remove Pennsylvania from their list of scheduled States and rescind all restrictions upon the movements of cattle from this State to Illinois, to the end that the fact may be made clear that export cattle passing Eastward through Pennsylvania are not exposed to more danger of foot and mouth infection than they are in other uninfected States, as, for example, in Illinois.

(Signed)

Jesse K. Cope,
J. D. Detrich,

Austin Leonard,
for the Dairy Union.

W. C. Norton, Pres. Pa. Live Stock Breeders' Ass'n.,

E. S. Bayard, Sec. Pa. Live Stock Breeders' Ass'n.

WHEREAS, Dr. Leonard Pearson has with marked ability and fidelity filled the position of Secretary of the Pennsylvania Live Stock Sanitary Board, and whereas, his term of office is now about to expire, therefore, be it

Resolved by the Pennsylvania Dairy Union and the Pennsylvania Live Stock Breeders' Association in joint convention assembled, that we heartily endorse Dr. Pearson for re-appointment to the same office.

Mr. J. D. Detrich: I move that this Association ask for an appropriation of \$1,000.

The President: I think that would have to come through the Agricultural Department.

Professor Hamilton: I want to say for the information of those here, that which I announced yesterday, that I expect to ask for an appropriation for the expenses of this organization as well as for those of the Dairy Union, and the State Horticultural Society. I think all these organizations ought to be supported in part by the State. I made such a request before, but it was turned down in Committee. I think this time, however, the appropriation can be secured.

Mr. Detrich's Resolution was seconded and carried.

Professor Hamilton: I want to say that I am greatly interested in the success of this organization, not simply for the purpose of bringing together men interested in similar occupations and business interests, but because of the influence they have in the several communities in building up the stock industry of Pennsylvania. I am having a bulletin prepared now for the Department of Agriculture that is to discuss the question of our production of animals for the market in this State. The gentlemen who is to prepare this bulletin is thoroughly equipped.

I want to say further that I intend to make a recommendation to the Governor looking toward the improv-

ment of our County Fair associations. I think each one of these should take an interest in the building up of the live stock industry of our State. One of the difficulties in carrying out the teachings of Professor Plumb and other gentlemen who have spoken here is because we do not have in the communities in which many of us live the opportunity of making a selection of the animals we desire to breed. We may have information of what we need, but the animals are not within our reach. I believe that the County Fair associations should own at least some of these animals so that breeders could secure the services of typical animals of high grade. I think such an arrangement would be a good investment for the associations. I am

going to ask for some legislation that will enable the Department of Agriculture to bring about that condition of affairs. At the proper time I want the co-operation of every member of the Pennsylvania Live Stock Breeders' Association, and of the Dairy Union; also of other men interested in the development of the live stock industry of Pennsylvania.

The President: I wish to thank you again, gentlemen, for the honor of re-electing me President. I think many men would have served better, have brought more influence to bear, and done more good for the Association. I, however, again thank you.

Upon motion the Association adjourned to meet at the call of the Executive Committee.



WHAT WE BREED.

Pure Bred Stock Bred by Members of the
Pennsylvania Live Stock Breeders'
Association.

HORSES.

THOROUGHBREDS.

Name	Postoffice.	County.
R. S. Hartley	Dugall	Warren

STANDARD BREDS

H. C. & M. R. Elder	Darlington	Beaver
W. A. McCoy & Sons	Mercer	Mercer
Henry Palmer	Avondale	Chester
Ezra Michener	Michener	Bucks
Powell Bros.	Shadeland	Crawford
W. H. Ridge	Treviso	Bucks
Ridge Farm (W.C. Norton)	Aldenville	Wayne
W. H. Rink	Jennerstown	Somerset
W. E. Stevenson	Burgettstown	Washington

FRENCH COACH.

Geo. Erk	Seelyville	Wayne
Powell Bros.	Shadeland	Crawford

HACKNEYS.

Powell Bros.	Shadeland	Crawford
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CLYDESDALES.

H. C. & M. R. Elder	Darlington	Beaver
Powell Bros.	Shadeland	Crawford

PERCHERONS.

E. B. Boyle	Canonsburg	Washington
W. A. McCoy & Sons	Mercer	Mercer
Powell Bros.	Shadeland	Crawford

SADDLE HORSES.

Julius LeMoine	Washington	Washington
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ENGLISH SHIRES.

Powell Bros.	Shadeland	Crawford
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CLEVELAND BAYS.

Powell Bros.	Shadeland	Crawford
Nelson Spedding	Clifford	Susquehanna

SHETLAND PONIES.

Wm. F. Gable	Wyebrooke	Chester
Powell Bros.	Shadeland	Crawford
W. H. Rink	Jennerstown	Somerset
W. M. Thompson	Uniontown	Fayette

CATTLE.

SHORTHORNS.

Name	Postoffice.	County.
W. C. Black	Mercer	Mercer
John Cummins	Cummins	Greene
E. M. Campbell	Leech's Corners	Mercer
Lagley Bros.	North Springfield	Erie
W. A. McCoy & Sons	Mercer	Mercer
R. L. Munce	Canonsburg	Washington
W. J. Monroe	Delmont	Westmoreland
B. L. Post & Sons	Claysville	Washington
Pa. State College	State College	Center
Geo. D. Rutter	York	York
Lee R. Scott	Burgettstown	Washington
A. G. Shaffer	Atwood	Armstrong
T. M. Shively	Mifflinburg	Union

John D. Smith	Castle	Greene
S. W. Solenberger	Chambersburg	Franklin
W. L. & Geo. S. Strosnider	Cummins	Greene
Thos. Turnbull, Jr.	Monaca	Beaver
W. M. Thompson	Uniontown	Fayette
J. R. Truxal	Mutual	Westmoreland
R. C. Vance	Burgettstown	Washington
A. S. Worden	Ulysses	Potter
T. M. McKee	Lewistown	Mifflin
F. J. McCain	Mercer	Mercer
L. D. May	Granville Center	Bradford

POLLED DURHAMS.

Chas. Buchanan	Utica	Venango
Albert DeFrance	Sandy Lake	Mercer
Horace A. Field	Wellsboro	Tioga
J. C. Mattern & Sons	Holidaysburg	Blair

RED POLLS.

D. Norman App	Selin's Grove	Snyder
B. E. Ferris	Hector	Potter
L. D. Grove	Holbrook	Greene
T. M. Shively	Mifflinburg	Union
N. O. Brownlee	Claysville	Washington
R. W. Crothers & Son	Taylorstown	Washington

ABERDEEN-ANGUS.

Geo. Black	Plumville	Indiana
Bayard Bros.	Waynesburg	Greene
James Blair	Espyville Station	Crawford
Penn'a State College	State College	Center
W. H. Rink	Jennerstown	Somerset

DEVONS.

L. K. King	Westfield	Tioga
J. Cheston Morris	West Chester	Chester
Powell Bros.	Shadeland	Crawford
A. S. Worden	Ulysses	Potter

HOLSTEINS.

J. L. Henderson & Son	Washington	Washington
H. M. Lyon & Son	Spring Hill	Bradford
Miller Bros.	Stonybrook	York
J. M. Quivey	Houston	Washington
Powell Bros.	Shadeland	Crawford
W. E. Stevenson	Burgettstown	Washington
V. W. Johnston	Clymer	Tioga

JERSEYS.

Geo. S. Barnhart	Greensburg	Westmoreland
J. C. Bebout	Canonsburg	Washington
F. C. Bosler	Carlisle	Cumberland
E. B. Boyle	Canonsburg	Washington
Jno. H. Burgin	Huntingdon Valley	Montgomery
Leonard & Son	Troy	Bradford
R. I. Young	Middletown	Dauphin
Geo. Erk	Seelyville	Wayne
H. C. & M. R. Elder	Darlington	Beaver
C. W. Gammell	Bethany	Wayne
R. S. Hartley	Dugall	Warren
Wm. W. Harrison	Glenside	Philadelphia
Chas. W. Henry	Chestnut Hill	Philadelphia
W. F. Holtzer	Greensburg	Westmoreland
G. H. Knapp	Aldenville	Wayne
J. F. Lantz & Co.	Barneston	Chester
L. W. Lighty	East Berlin	Adams
J. M. Main & Sons	Shippensburg	Cumberland
Robert McCoy	Slippery Rock	Butler
Benj. W. McKeehan	Mt. Rock	Cumberland
A. L. Martin	Harrisburg	Dauphin
W. F. McSparran	Furnias	Lancaster
S. E. Nivin	Landenburg	Chester
J. C. Peck	Carbondale	Lackawanna
Perham Bros.	Niagara	Wayne
Henry M. Phillips	Pittsburg	Allegheny
Powell Bros.	Shadeland	Crawford
Ridge Farm	Aldenville	Wayne
R. F. Shannon	Edgeworth Station	Allegheny
W. F. Shrum	Adamsburg	Westmoreland
M. P. Shoemaker & Bro.	Greensburg	Westmoreland
Edward Walter	West Chester	Chester
A. P. Warren	Elizabeth	Allegheny
Wm. R. Williams	Germantown	Philadelphia
J. B. Wylie	Washington	Washington

GUERNSEYS.

Henry PalmerAvondaleChester
 R. S. HartleyDugallWarren
 H. C. BughmanPittsburgAllegheny
 H. W. ComfortFallsingtonBucks
 Wm. F. GableWyebookeChester
 Henry PalmerAvondaleChester
 Pa. State College, State CollegeCenter
 Nelson PoorbaughMt. PleasantWestmoreland.
 W. H. KidgeTrevoeBucks.
 W. S. StevensonButlerButler.
 Hon. J. F. Woodmansee, Lake ComoWayne.
 Shook Bros.Spring MillsCenter
 Ezra Michener.....MichenerBucks
 F. E. TraverWyebookeChester
 H. H. Snavey.....LancasterLancaster

AYRESHIRE.

Thos. Turnbull, Jr. . Allegheny.....Allegheny

HEREFORDS.

J. I. Barley Baker's Summit Bedford.

POLLED ALBIONS.

R. E. Ferris Hector Potter.

BROWN SWISS.

R. I. Young.....MiddletownDauphin

SWINE.

POLAND CHINAS.

Name.	Postoffice.	County
D. Norton App	Sella's Grove	Snyder
J. I. Barley	Baker's Summit	Bedford.
H. C. Bughman	Pittsburg	Allegheny
Burns & Adams	Clinton	Allegheny
Eagley Bros.	North Springfield	Erie.
H. C. & M. R. Elder	Darlington	Beaver
L. D. Grove	Holbrook	Greene.
L. D. Harrington	North Water Gap	Monroe
W. A. Lothers	Lack	Junata.
Henry Palmer	Avondale	Chester
Robert McCoy	Slippery Rock	Beaver
Miller Bros	Stonybrook	York
B. L. Post & Sons	Claysville	Washington
Nelson Spedding	Clifford	Susquehanna
T. M. Shively	Mifflinburg	Union
A. G. Shaffer	Atwood	Armstrong.
A. P. Warren	Elizabeth	Allegheny.
J. B. Wylie	Washington	Washington
T. M. McKee	Lewistown	Mifflin

TAMWORTHS.

F. C. Bosler Carlisle Cumberland.
 R. S. HartleyDugallWarren
 Henry PalmerAvondaleChester
 Ridge FarmAldenvilleWayne.
 M. P. Shoemaker & Bro., GreensburgWestmoreland.

CHESTER WHITES.

Geo. S. BarnhartGreensburgWestmoreland.
 E. B. BoyleCanonsburgWashington
 H. C. BughmanPittsburgAllegheny.
 J. Grier DainMalvernChester.
 Jos. T. FlemingBellvilleMifflin.
 Wm. F. GableWyebookeChester
 H. M. Lyon & SonsSpring HillChester
 J. F. Lantz & Co.BarnestonChester.
 W. A. McCoy & SonsMercerMercer.
 B. W. McKeeMt. RockCumberland.
 J. C. Mattern & Sons, HollidaysburgBlair
 W. J. MonroeDelmontWestmoreland.
 R. L. MunceCanonsburgWashington.
 Edward WalterWest ChesterChester.
 A. P. WarrenElizabethAllegheny.
 Hon. J. E. Woodmansee, Lake ComoWayne.
 Shook Bros.Spring MillsCenter
 M. P. Shoemaker & Bro., GreensburgWestmoreland.
 T. R. TruxallMutualWestmoreland.

BERKSHIRES.

George BlackPlumvilleIndiana.
 W. C. BlackMercerMercer.
 Jno. H. BurginHuntindon ValleyMontgomery.
 E. M. CampbellLeech's CornersMercer
 Jas. L. Henderson & Son, WashingtonWashington.
 W. F. HoltzerGreensburgWestmoreland.
 L. W. LightyEast BerlinAdams.
 W. A. LothersLackJunata.
 J. M. Main & SonsShippensburgCumberland
 S. V. McDowell & SonsFredoniaMercer
 W. F. McSparranFurnissLancaster
 Pa. State College, State CollegeCenter.
 Nelson Poorbaugh, Mt. PleasantWestmoreland.
 Ridge FarmAldenvilleWayne.
 W. H. RinkJennerstownSomerset.
 R. F. ShannonEdgeworth StationAllegheny.
 Thos. Turnbull, Jr.,MonacaBeaver.
 Shook Bros.Spring MillsCenter
 A. S. WordenUlyssesPotter
 N. O. BrownleeClaysvilleWashington
 R. W. Crothers & Son, TaylorstownWashington

DUROC JERSEYS.

George BlackPlumvilleIndiana
 John Cassidy & SonHanlin StationWashington

YORKSHIRES.

V. W. Johnston.....ClymerTioga

ESSEX.

Name.	Postoffice.	County
H. C. & M. R. Elder	Darlington	Beaver

SHEEP.

DORSETS.

Name.	Postoffice.	County
F. C. Posler	Carlisle	Cumberland.
J. L. Henderson & Son	Washington	Washington
Dr. W. L. McCleary	Washington	Washington
Henry Palmer	Avondale	Chester
J. B. Wylie	Washington	Washington
R. W. McKee	Tewistown	Mifflin

SHROPSHIRE.

J. C. Rebout Canonsburg Washington
 J. I. Barley Baker's Summit Bedford.
 W. C. Black Mercer Mercer.
 H. C. & M. R. Elder, Cannelton Beaver.
 W. F. Gable Wyebooke Chester
 J. F. Lantz & Co. Barneston Chester.
 W. A. Lothers Lack Junata.
 S. Shaffer Princeton Lawrence.
 V. W. Johnston.....ClymerTioga

LEICESTERS.

W. A. McCoy & Sons, Mercer Mercer.

LINCOLNS.

T. M. ShivelyMifflinburgUnion
 Edward WalterWest ChesterChester.

SOUTHDOWNS.

J. Grier Dain Malvern Chester.
 W. A. McCoy & Sons, Mercer Mercer.
 T. M. Crothers & Son, TaylorstownWashington

SPANISH MERINOS.

Jas. Lindsay & Sons UticaVenango
 R. C. VanceBurgettstownWashington.

BLACKTOP SPANISH MERINOS.

John M. BerryWyandvilleWashington.
 Wm. BerryWashingtonWashington.
 R. P. BerryWashingtonWashington.

Dr. W. L. McCleary, Washington Washington.
 R. J. Munce Canonsburg Washington.
 J. D. Smith CastileGreene
 R. W. Crothers & Son, TaylorstownWashington

DELAINE MERINOS.

E. B. BoyleCanonsburgWashington
 Lee R. ScottBurgettstownWashington.

NATIONAL DELAINES.

J. B. Wylie Washington Washington.
 R. W. Crothers & Son, Taylorstown Washington

OXFORDS.

E. M. CampbellLeech's CornersMercer
 A. G. ShafferAtwoodArmstrong
 A. S. WordenUlyssesPotter.

HAMPSHIRE.

Jas. BlairEspyville StationCrawford

COTSWOLDS.

S. V. McDowell & Sons, Fredonia Mercer.

ANGORA GOATS.

Horace A. Field Wellsboro Tioga.
 W. F. GableWyebookeChester

POULTRY.

PLYMOUTH ROCKS.

Name.	Postoffice.	County
N. O. Brownlee (B.)	Claysville	Washington.
H. C. Bughman (W.)	Pittsburg	Allegheny
Burns & Adams	Clinton	Allegheny
J. Grier Dain (B.)	Malvern	Chester.
Eagley Bros (B & W), N. Springfield		Erie
H. C. & M. R. Elder (B), Cannelton		Beaver.
J. Wolf Evans (Buff), Spring Mills		Center.
Geo. H. Fowler	Stoneboro	Mercer.
Wm. F. Gable (B & W), Altoona		Blair.
L. D. Harrington	North Water Gap	Monroe
Chas. W. Henry	Chestnut Hill	Philadelphia
W. F. Holtzer (B)	Greensburg	Westmoreland.
Edwin Johnson (B)	Dollington	Bucks
Theo. F. Jager, Exmoor Farms, Lebanon		Lebanon
L. K. King	Westfield	Tioga
H. M. Lyon & Sons (B & W) Spring Hill		Bradford
J. F. Lantz & Co.	Barneston	Chester
L. W. Lighty (B), East Berlin		Adams.
W. F. McSparran (B)	Furniss	Lancaster
W. A. McCoy & Sons (W), Mercer		Mercer.
Ezra Michener (W), Michener		Bucks
W. J. Monroe (B)	Delmont	Westmoreland.
A. S. Morrow	Plumville	Indiana.
Pa. State College, State College		Center.
Nelson Poorbaugh (B & W), Mt. Pleasant		Westm't'd.
Ridge Farm (W)	Aldenville	Wayne.
R. F. Shannon (B) Edgeworth Station		Allegheny
M. P. Shoemaker & Bro. (W), Greensburg		Westm't'd.
J. R. Truxall	Mutual	Westmoreland.
Thos. Turnbull, Jr. (B), Monaca		Beaver.
A. F. Warren (B & Buff), Elizabeth		Allegheny.
Shook Bros. (B & W) Spring Mills		Center
T. M. McKee, [Barred]	Lewistown	Mifflin

LEGHORNS.

Geo. S. Barnhart (Buff), GreensburgWestmoreland.
 H. C. Bughman (S O W), PittsburgAllegheny.
 H. C. & M. R. Elder (B & W) DarlingtonBeaver
 J. Wolf Evans (S O B & S O W), Spring Mills, Center.
 Wm. F. Gable (W) Altoona Blair.
 J. Wolfe Evans (W & B) Spring MillsCenter
 L. D. HarringtonNorth Water GapMonroe
 R. S. Hartley (B & Br)DugallWarren
 Theo. F. Jager, Exmoor Farms, LebanonLebanon
 J. M. Main & Sons (S O W), Shippensburg, Cumb'l'd.
 R. L. Munce (Br.)CanonsburgWashington
 Shook Bros. (B & W) Spring MillsCenter
 Pa. State College (Br) State CollegeCenter.
 Henry H. Phillips (W), Pittsburg Allegheny.

R. F. Shannon (B & W) Edgeworth Sta. Allegheny
 W. L. & Geo. G. Strosnider (Br) CumminsGreene
 M. P. Shoemaker & Bro (Br), Greensburg, Westm't'd.
 J. F. Woodmansee (W) Lake ComoWayne
 A. P. Warren (Buff), Elizabeth Allegheny.

SANTAMS.

H. C. BughmanPittsburg Allegheny
 W. A. McCoy (Wh G)MercerMercer
 R. F. Shannon (B B R Game), Pittsburg Allegheny.
 Shook BrosSpring MillsCenter

BRAHMAS.

B. E. Ferris (Lt) Hector Potter
 Wm. F. Gable (Lt) WyebookeChester
 Penn'a State College (Lt) State CollegeCenter
 R. F. Shannon (Lt and Dark) Edgeworth StationAllegheny.

COCHINS.

W. F. Gable (Buff) WyebookeChester
 John M. Berry (W), Wyandville Washington.
 Pa. State College (Lt), State CollegeCenter.
 R. F. Shannon (Lt & Dk), Edgeworth Sta., Allegheny.

MINORCAS.

R. S. HartleyDugallWarren
 Wm. F. GableWyebookeChester
 Chas. W. Henry, Chestnut Hill (Phila.), Philadel.
 Pa. State College (Blk) State CollegeCenter.
 R. F. Shannon (Blk), Edgeworth Station, Allegheny
 Thos. Turnbull, Jr.,MonacaBeaver.

POLISH.

Penn'a State CollegeState CollegeCenter

RHODE ISLAND REDS.

Chas. W. Henry Chesnut HillPhiladelphia
 Penn'a State CollegeState CollegeCenter
 Miller BrosStonybrookYork

WHITE WONDERS.

T. M. ShivelyMifflinburgUnion

GAMES.

Pa. State CollegeState CollegeCenter.
 Henry M. Phillips (B R), Pittsburg Allegheny.

FAVEROLLES.

Pa. State CollegeState CollegeCenter.

WYANDOTTES.

T. E. Orr (Silver, Partridge & Wh), BeaverBeaver
 Penn'a State CollegeState CollegeCenter
 Theo. F. Jager, Exmoor Farms, LebanonLebanon
 L. D. HarringtonNorth Water GapMonroe
 Bayard Bros. (Wh), WaynesburgGreene.
 Wm. F. Gable (Buff)WyebookeChester
 Julius LeMoine (Wh), WashingtonWashington.
 Chas. C. Townsend (5 var.), Westchester, Chester.
 Ezra MichenerMichenerBucks
 Shook Bros. (W & Sil) Spring MillsCenter
 F. E. Traver, [Buff] WyebookeChester
 R. W. Crothers & Son, TaylorstownWashington

HAMBURGS.

Shook BrosSpring MillsCenter

BUFF ORPINGTONS.

T. E. Orr BeaverBeaver
 W. A. McCoy & SonsMercerMercer.
 R. F. Shannon, Edgeworth Station Allegheny.

TURKEYS.

H. C. & M. R. Elder (Br), DarlingtonBeaver
 T. M. Shively (W. Hol.) Mifflinburg Union

B. L. Post & Sons (M B) Claysville Washington
 Theo. F. Jager, Exmoor Farms, Lebanon.. Lebanon
 John M. Berry (W Hol), Wylandville, Washington.
 W.A. McCoy & Sons (W. Hol), Mercer Mercer.
 J. L. McCough (Buff)...Mansmore..... Washington
 A. G. Shaffer Atwood Armstrong.
 J. R. Truxal Mutual Westmoreland.
 L. K. King, [W. Hol.] Westfield.....Tiago
 R.W.Crothers & Son,[W. H.] Taylorstown, Washington

DUCKS.

Edwin Johnson (Pekin) ..Dollington Bucks
 Theo. F. Jager, Exmoor Farms, Lebanon.. Lebanon
 W.A. McCoy & Sons (Pekin), Mercer Mercer.
 J. F. Lantz & Co.(Pekin) Barneston Chester
 Shook Bros.(P. & R.) Spring Mills.....Center

GUINEAS.

W.A.McCoy & Sons (Wh), Mercer Mercer.

GEESE.

Theo. F. Jager, Exmoor Farms, Lebanon.. Lebanon
 W. A. McCoy & Sons (W. Chi), Mercer Mercer.
 Shook Bros. [W. Chi] Spring Mills.....Center

PEAFOWLS.

W. A. McCoy & Sons .. Mercer Mercer.

PIGEONS.

W. A. McCoy & Sons (W Fan), Mercer Mercer.

PETS.**BELGIAN HARES.**

Name.	Postoffice.	County
H. C. Bughman	Pittsburg	Allegheny.
Eagley Bros.	North Springfield	Erie.
W. J. Monroe	Delmont	Westmoreland.

DOGS.

Chas. W. Henry (Collies and Irish Terriers)
 Chestnut Hill (Phila.), Philadelphia.

Name.	Postoffice.	County
J. F. Lantz & Co. (Beagles)...	Barneston...	Chester
J. M. Mulin & Sons (Irish Setts)	Shippensburg...	Cum
T. M. McKee, [Collies],	Lewistown	Mifflin
Thos. Turnbull, Jr., (Bull Terriers)	Allegheny.	All'y

COLLIES.

J. Grier Dain	Malvern	Chester.
Theo. F. Jager, Exmoor Farms,	Lebanon	Lebanon
T. E. Orr	Beaver	Beaver.
H. M. Lyon & Sons	Spring Hill	Bradford
B. L. Post & Sons	Claysville	Washington
I. L. Stevens	Elkdale	Susquehanna.
Edward Walter	West Chester	Chester.

AIRSDALE TERRIERS.

R. F. Shanuan.. Edgeworth Station .. Allegheny.

FERRETS.

B. L. Post & Sons ..ClaysvilleWashington

MEMBERS WHOSE STOCK IS NOT REPORTED.

Name.	Postoffice.	County
Dr. H. P. Armsby	State College	Center
S. W. Berry	Canonsburg	Washington
Geo. M. Earnest	Greensburg	Westmoreland
Dillon Gibbons	Yohoghan	Westmoreland
Prof. John Hamilton	Harrisburg	Dauphin
S. S. Hutchison	Warriorsmark	Huntingdon
J. M. Hustead	Uniontown	Fayette
T. D. Harman	Pittsburg	Allegheny
James Meloney	McDonald	Washington
L. L. Pope	Cleveland, Ohio	Washington
Chas. A. Porter, Torresdale	[Philadelphia]	Philadelphia
W. C. Patterson	State College	Center
Dr. Leonard Pearson	Philadelphia	Philadelphia
Henry H. Randt	Pipersville	Bucks
A. R. Van Tassel	Dubois	Clearfield
Prof. G. C. Watson	State College	Center
A. H. Hardman	Curtin	Dauphin

J. S. Burns.

W. E. Adams.

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 Either Sex
 For Sale.



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Uniontown, Pa.

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SHETLAND PONIES.

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RAMS AND 3 STOCK RAMS.

FOR DENSITY, COVERING, WEIGHT and
QUALITY OF FLEECE, LENGTH and
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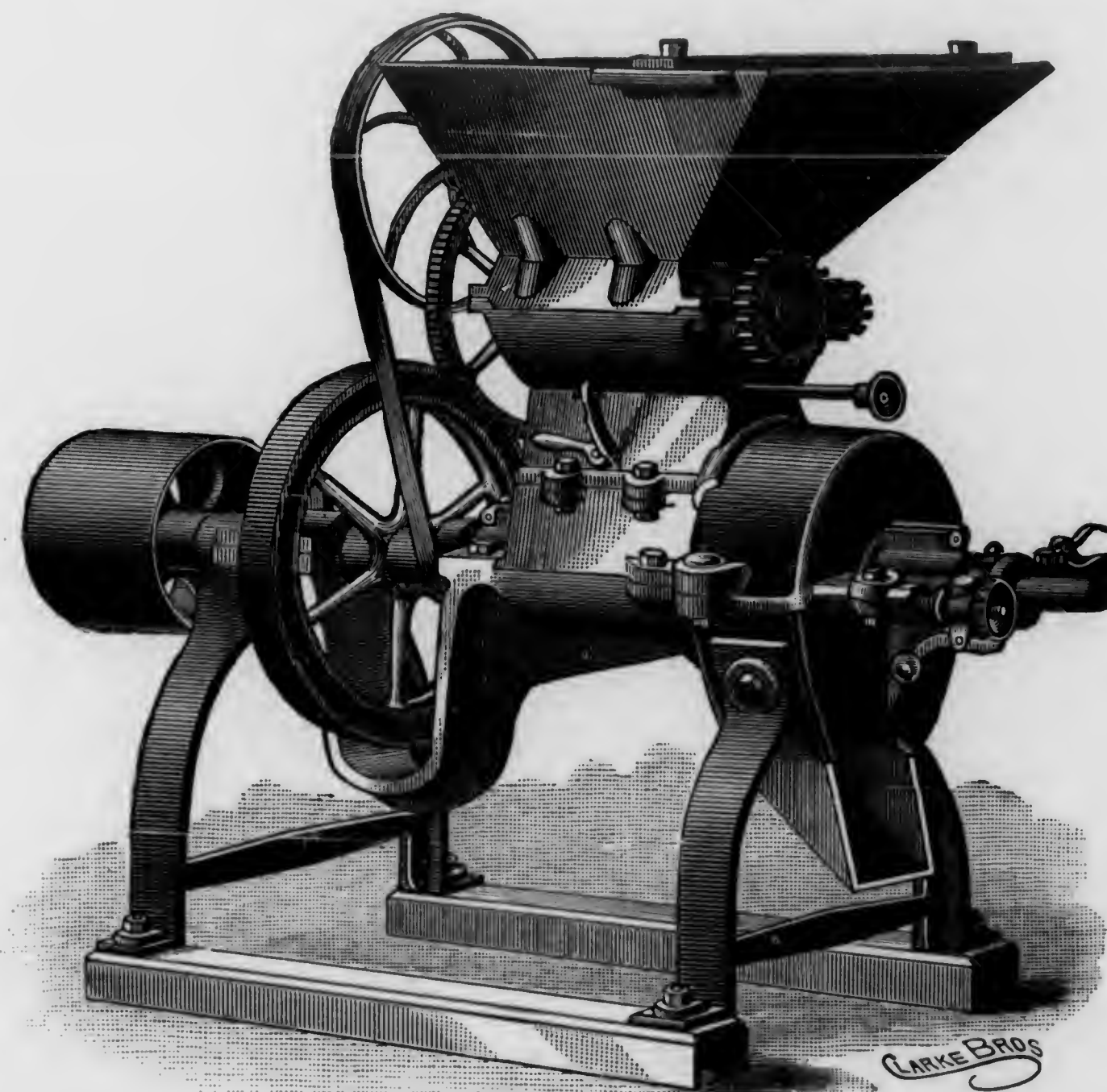
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